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GOLDEN RULES FOR TRANSBOUNDARY POLLUTION

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INTRODUCTION

Environmental law is becoming ever more centralized. In the United States, state and local pollution laws have been eclipsed by federal regulation.[1] In the European Community, and to a lesser degree under the North American Free Trade Agreement (NAFTA), national controls have been supplemented by regional regulation.[2] And the growing importance of treaties regulating particular aspects of the global environment has reinforced calls for more general regimes of international environmental regulation.[3]

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† John Paul Stevens Professor of Law, Northwestern University. This Article has had an unusually long gestation period. The author would like to thank the participants in workshops conducted at Stanford and Washington University Law Schools in 1993 for their comments on earlier drafts. More recent drafts have benefitted from the insights of Ken Abbott, David Dana, Anthony D'Amato, Richard Lazarus, and David Schoenbrod. Three generations of research assistants, Elizabeth Williams, Kate Boer, and Laura Colthrust, have made important contributions to different aspects of the paper. Financial support was provided by the Kathleen M. Haight, Vilas M. Swan, and Law School Class of 1962 Reunion Gift Funds.

1. *See generally* Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 MD. L. REV. 1141 (1995) (tracing the growth of the federal role over time).

2. *See* ECKARD REHBINDER & RICHARD STEWART, 2 INTEGRATION THROUGH LAW: EUROPE AND THE AMERICAN FEDERAL EXPERIENCE, ENVIRONMENTAL PROTECTION POLICY 57–104 (1985) (tracing evolution of European Union environmental law); Steve Charnovitz, *The NAFTA Environmental Side Agreement: Implications for Environmental Cooperation, Trade Policy, and American Treatymaking*, 8 TEMP. INT'L & COMP. L.J. 257, 260–71 (1994) (discussing the North American Agreement on Environmental Cooperation, the environmental side agreement to NAFTA).

3. *See, e.g.*, Robert W. Hahn & Kenneth R. Richards, *The Internationalization of Environmental Regulation*, 30 HARV. INT'L L.J. 421, 423–27 (1989) (discussing the forces

One inevitably given justification for this centralizing trend is that pollution is a transboundary phenomenon.[4] Air and water pollution, and to a lesser extent groundwater contamination, can cross political boundaries. Moreover, pollution that originates in one state and spills over into another is very difficult for either jurisdiction to regulate effectively. The source state may be reluctant to impose expensive controls on local industry when the benefits will inure to political outsiders. The affected state may not be able to obtain jurisdiction over actors in the source state, or, if it can obtain jurisdiction, the affected state may have trouble enforcing any decree it enters. Given the inherent difficulties in regulation by any single state, transboundary pollution would seem to present a clear case for shifting regulatory authority from local to more centralized levels of governance.[5]

When one examines existing environmental regimes more closely, however, a paradox emerges. Notwithstanding the broad general trend toward centralized regulatory authority in environmental law, and the widespread invocation of transboundary pollution as a justification for that trend, little meaningful regulation of transboundary pollution actually exists.

The customary international law of transboundary pollution, for example, is based on a very small number of inconclusive adjudications and a mountain of official declarations and unofficial

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driving the internationalization of environmental issues).

4. *See, e.g.*, ALLEN L. SPRINGER, THE INTERNATIONAL LAW OF POLLUTION: PROTECTING THE GLOBAL ENVIRONMENT IN A WORLD OF SOVEREIGN STATES 13 (1983) (stating that the "first type of internationally significant environmental change . . . [is] transboundary pollution"); Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570, 593, 626–27 (1996) ("The presence of transboundary harm demands some form of overarching governmental action across the scope of the harm."); Richard L. Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. PA. L. REV. 2341, 2342–43 (1996) (describing "interstate externalities" as a primary reason for environmental regulation at the federal level); Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1226–30 (1977) (arguing that the federal government should have power to implement controls to prevent spillover effects).

5. Even commentators hostile to centralization of environmental law generally recognize an exception for transboundary pollution. *See, e.g.*, Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL'Y REV. 23, 33 (1996) (noting that transboundary pollution is an interstate externality providing strong economic justification for federal intervention); Jacques LeBoeuf, *The Economies of Federalism and the Proper Scope of the Federal Commerce Power*, 31 SAN DIEGO L. REV. 555, 570–71 (1994) (similar position).

commentary seeking to make something out of them.[6] When one turns to international treaties, the situation is only slightly better. Although there are over 200 international agreements dealing with environmental matters,[7] only a few deal specifically with transboundary pollution. And with isolated exceptions, the transboundary treaties that do exist are largely devoted to encouraging information-sharing and consnltation, rather than establishing liability regimes or prescribing substantive limitations on polluting activity.

One would think that the situation inust be different within a mature federal systeiii like the United States, where transboundary pollution from one state to another has long been recognized as a problem.[8] In fact, the law that governs pollntion crossing state lines in the Uiiited States is nearly as undeveloped as the international law governing transboundary pollution. During the first three decades of the twentieth century, the United States Supreme Court began the process of articulating a federal common law of interstate pollution in a string of cases in which the Court exercised original jurisdiction.[9] More recently, however, the Court has engaged in a series of gyrations about the source of law that applies to transboundary nuisances,[10] and in so doing has hindered the development of a coherent body of decisional law.

Perhaps more surprisingly, the federal regulatory statutes that one would expect to address transboundary pollution—principally the Clean Air Act[11] and the Clean Water Act[12]—have themselves largely failed to regulate transboundary pollution. The Clean Air Act prohibits emission activity in one state that contributes significantly to other states' noncompliance with air quality standards,[13] but no state has ever secured relief under this provision.[14] The Clean Water Act has been interpreted by the Envi-

6. *See infra* text accompanying notes 108–22.

7. *See* Daniel Barstow Magraw, *International Law and Pollution*, *in* INTERNATIONAL LAW AND POLLUTION 12 (1991).

8. *See* Georgia v. Tennessee Copper Co., 206 U.S. 230, 236 (1907) (recounting Georgia's complaint regarding air pollution emanating from copper smelters in Tennessee); Missouri v. Illinois, 200 U.S. 496, 497 (1906) (detailing Missouri's claim that Illinois polluted the Mississippi River by discharging raw sewage into the river).

9. *See infra* text accompanying notes 27–69.

10. *See infra* text accompanying notes 77–81.

11. 42 U.S.C. §§ 7401–7671q (1994).

12. 33 U.S.C. §§ 1251–1387 (1994).

13. *See* 42 U.S.C. §§ 7410(a)(2)(D)(i), 7426.

14. *See infra* note 143 and accompanying text.

ronmental Protection Agency (EPA) as prohibiting discharges in one state that cause detectable violations of water quality standards in another state.[15] Again, however, there are very few reported cases in which this interpretation has been enforced.[16]

In both international and domestic law, therefore, one sees a failure to develop an effective ceutral regime for regulating transboundary pollution. Case-by-case approaches based on customary international law or American common law have failed to address the problem in a sustained fashion, and as a consequence no specific legal norms have been generated. Enacted law, whether bi- or multilateral international treaties or federal statutes, has also proven to be largely ineffectual.

This Article asks why regulation of transboundary pollution remains so underdeveloped in a world where environmental policy in general is becoming increasingly centralized. In Part I, I canvass in greater detail the disparity between official norms and legal reality in the regulation of transboundary pollution. The official norms of customary international law and U.S. statutory law are essentially the same: the source state is held strictly liable for all transboundary pollution that causes "significant" or "serious" harm in another state.[17] Yet, when one examines the actual legal regimes established to address transboundary pollution—whether in international law or in the federal system of the United States—one finds that this norm is almost never invoked or enforced. The only meaningful, centralized regulation of transboundary pollution is found in agreements in which two or more contiguous states agree on specific pollution control measures. Such agreements are also rare, however, and consequently transboundary pollution as such goes largely unregulated.

In Part II, I ask whether certain structural features common to transboundary pollution disputes account for this failure. A transboundary pollution control regime will emerge only if its benefits exceed the costs of its establishment and maintenance. There are a number of reasons why the benefits may fall short of the costs. Of particular significance is the sharply conflicting na-

15. *See* Arkansas v. Oklahoma, 503 U.S. 91, 104–05 (1992) (stating that the EPA has authority to mandate compliance by one state with respect to water quality standards of another state).

16. *See infra* notes 152–56 and accompanying text.

17. *See infra* notes 22, 109.

ture of the interests of the disputing parties. The source state obtains the benefits of the polluting activity and externalizes some of the costs of pollution to the affected state; the affected state bears the costs of pollution but enjoys few or none of the benefits of polluting. Thus, the source state has no incentive to participate in a regime of centralized regulation unless it receives compensation of some sort from the affected state. Devising such a scheme is awkward and expensive. The only advantageous structural feature of transboundary pollution disputes lies in the fact that, typically, only a small number of states (often two) are involved; this shonld facilitate the negotiation of Coasean bargains.[18] It is this feature that explains why agreements negotiated among a small number of states are the most commonly-observed regulatory response to transboundary pollution.

In Part III, I consider the additional possibility that the failure of transboundary pollution regulation is partly a function of the official legal norm of strict liability that supposedly governs these disputes. If, as the survey in Part II indicates, Coasean bargains present the most promising avenue for regulating transboundary pollution, legal norms could disrupt bargaining over transboundary pollution in several ways. Such norms could lead to uncertainty about the outcome if the parties fail to reach an agreement. Moreover, these norms could create opportunities for states to take threatening positions in an attempt to bargain strategically. And finally, they could allow states to conceal information about how they evaluate the costs and benefits of collective action. I argue that the norm of strict liability, as it operates in practice, generates all three problems, and that this norm thus may have unintentionally contributed to the general failure to establish a system of collective action.

In Part IV, I return to the original jurisdiction decisions rendered by the United States Supreme Court in the first three decades of this century. Although it is possible to read these decisions as adopting a universal norm of strict liability for trans-

18. A Coasean bargain, so named of course for Ronald Coase, is an agreement to rearrange legal entitlements relative to the way they are assigned by law. *See* Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 2–8 (1960). The usual assumption is that if transaction costs are low, such bargains will occur as a matter of course. *See id.*; *see also* Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 15–20 (1982) (discussing the plausibility of this assumption).

boundary pollution, I argue that the decisions are better read as endorsing a particularized search for equitable solutions to each dispute. Moreover, some of these decisions adopt a norm of reciprocity as a central element for identifying the appropriate equitable solution; specifically, they invoke the equitable maxim of "clean hands"— that one who seeks equity must do equity—as a justification for denying relief to states complaining of pollution emanating from other states. The maxim suggests a "golden rule," to the effect that the affected state is entitled to be treated by the source state in the same way as the affected state treats its own citizens. Under such a rule, the critical question in a transboundary pollution suit becomes whether the affected state has been exposed to pollution to a degree that would give rise to a regulatory response if the pollution had been introduced by a private citizen in the affected state.

In Part V, I will advance some reasons why such a golden rule, operating in tandem with another golden rule that would require source states to treat affected states as well as the source state treats its own citizens, provides a more satisfactory starting point for overcoming the structural barriers to the effective regulation of transboundary pollution. These golden rules of interstate behavior build on a fortuitous aspect of transboundary pollution not present in private nuisance disputes: each antagonist is at once a party to the dispute and a regulator of similar disputes. The golden rules capitalize on this feature by insisting that the source state simply respect a normative judgment that it or the affected state have already demonstrated they are prepared to impose on themselves in their capacity as regulators. I argue that this more context-specific norm would be superior to a universal norm of strict liability on all fronts: it would generate more predictable assessments of the requirements of the law; it would minimize the opportunities for strategic bargaining; and it would force the parties to disclose information about their true evaluations of the costs and benefits of regulation.

I do not claim that the golden rules offer a panacea for transboundary pollution. The very real structural obstacles to effective regulation discussed in Part II will continue to frustrate most proposals for collective action. Furthermore, there are circumstances in which the golden rules would not improve upon strict liability—for example, where the polluting activity is novel and has not given rise to any tradition of regulation in either

state. My contention is more modest and comparative: the golden rules, with their appeal to a general standard of reciprocity, provide a better foundation for building a consensus for meaningful regulation of transboundary pollution than does the current assumption in favor of a universal norm of strict liability.

I. THE PROMISE OF TRANSBOUNDARY POLLUTION CONTROL—AND THE REALITY

It is a commonplace that "law in books" is often different from "law in action."[19] Rarely is this more true than with respect to transboundary pollution. Reading the authoritative sources of international customary law or the U.S. environmental statutes, one gets the impression that the regulation of transboundary pollution is quite demanding. A closer look at the bottom line—the amount of transboundary pollution that actually results in a finding of source state liability or is subject to specific regulatory limitations—reveals a very different reality. With isolated exceptions, transboundary pollution as such[20] is subject to very little effective regulation.

A. *Transboundary Pollution—The Law's Promise*

The regulation of transboundary pollution presents a number of difficult issues. These issues include: 1) the question of attribution, that is, whether a source state is legally responsible for transboundary pollution emanating from facilities operated by persons within its territorial jurisdiction;[21] 2) the question of causation, that is, the appropriate standard of proof for establishing

19. *See* Roscoe Pound, *Law in Books and Law in Action*, 44 AM. L. REV. 12, 15 (1910).

20. For discussion of the differences between "transboundary pollution" and other types of environmental concerns implicating more than one state, see *infra* Section II.A. As is suggested in Section II.B and briefly at the beginning of Part III, transboundary pollution can be regulated indirectly by regimes designed to control local pollution, or adopted for other reasons such as a desire to minimize the risk of regulatory competition among jurisdictions.

21. There is also the mirror image question of whether the affected state has standing to press claims on behalf of its citizens who claim to be injured by transboundary pollution. The U.S. Supreme Court established early on that an affected state may sue as *parens patriae* for injuries to its citizens, and need not prove separate and distinct injury to the affected state itself, for example, to property owned by the affected state. *See* Georgia v. Tennessee Copper Co., 206 U.S. 230, 237 (1907); Missouri v. Illinois, 180 U.S. 208, 240–41 (1901).

that pollution emanating from a source state has caused legally cognizable injury in an affected state;[22] and 3) the question of the standard of care, that is, whether a source state that has caused such injury will be held strictly liable, or will be held liable only if it is shown to have acted unreasonably or negligently. In addition, that is the question of choosing an appropriate remedy: if the affected state establishes liability on the part of the source state, is it entitled only to advance notice and consultation about transboundary pollution, can it demand monetary reparations, or can it block the continued operation of the polluting facilities in the source state?

Currently, there is a fairly high degree of consensus under both international customary law and U.S. statutory law about the answers to the first three of these questions: a source state is legally responsible for all transboundary pollution emanating from sources within its jurisdiction; a source state is liable only when such pollution is clearly proven to cause significant harm in the affected state; and once the threshold of significant harm is crossed, a source state is strictly liable for such harm. The appropriate remedy under international law is a matter of some disagreement. Some commentators insist that international law provides for awards of monetary damages for proven transboundary pollution.[23] Others argue that a right to advance notification and consultation is all that can be demanded.[24] Within the American federal system, the appropriate remedy is mandatory relief in the

22. Whether an injury is legally cognizable has usually been expressed in terms of the severity of the harm, such as whether the harm is "substantial," "significant," or "serious." *See, e.g.*, New York v. New Jersey, 256 U.S. 296, 309 (1921) ("serious magnitude"); *see also infra* note 109 (quoting sources using similar terms). A closely related question concerns what types of injuries may be compensated: only those injuries readily translatable into monetary terms, or more intangible interests, such as a threat to the ecosystem or psychological harm in the form of fear or apprehension about the long-term effects of such pollution. *See* Linda A. Malone, *The Chernobyl Accident: A Case Study in International Law Regulating State Responsibility for Transboundary Nuclear Pollution*, 12 COLUM. J. ENVTL. L. 203, 208–12, 239–40 (1987) (discussing the difficulty of recovering for intangible damages following the Chernobyl disaster, and arguing for reform); *see also* Alfred P. Rubin, *Pollution by Analogy: The Trail Smelter Arbitration*, 50 OR. L. REV. 259 (1971) (arguing that the tribunal's decision in the Trail Smelter Arbitration to limit damages to provable monetary loss was incorrect). I do not consider this issue here.

23. *See* SPRINGER, *supra* note 4, at 135–140; PATRICIA W. BIRNIE & ALAN E. BOYLE, INTERNATIONAL LAW AND THE ENVIRONMENT 152–53 (1994).

24. *See* CHRISTOPHER D. STONE, THE GNAT IS OLDER THAN MAN: GLOBAL ENVIRONMENT AND HUMAN AGENDA 55–57 (1993).

form of an administrative order forcing the offending facilities in the source state to abate their pollution in order to eliminate the illegal transboundary effect.[25]

To understand how these consensus views developed, it is useful to begin with a brief review of the cases in which the U.S. Supreme Court exercised its original jurisdiction in the early years of the twentieth century. These decisions reflect the views of the United States' most prestigious tribunal and the most prominent judge (Justice Oliver Wendell Holmes, Jr.) ever to consider the problem of transboundary pollution. As we shall see, the Court's decisions constitute the ultimate source for the current content of the international customary law. A brief introduction to these decisions is also appropriate, given that later in the article I will offer a revisionist interpretation of the Court's opinions.

1. *The Supreme Court's Original Jurisdiction Decisions.* Since its founding, the Supreme Court has exercised original jurisdiction in a variety of cases. The most common have been suits between states to establish boundary lines or title to specific lands.[26] In 1900, an original complaint was filed with the Court alleging that pollution emanating from one state was causing a public nuisance in another state.[27] In the ensuing thirty years or so, the Court exercised its original jurisdiction in five cases dealing with complaints about transboundary pollution.[28] The most important

25. *See* Clean Air Act, 42 U.S.C. § 7426(c) (1994); *see also* Arkansas v. Oklahoma, 503 U.S. 91, 95–97, 110–12 (1992) (summarizing the EPA's interpretation of the Clean Water Act).

26. *See* Note, *The Original Jurisdiction of the United States Supreme Court*, 11 STAN. L. REV. 665, 701–19 (1959) (listing all Supreme Court original jurisdiction cases and their causes of action).

27. *See* Missouri v. Illinois, 180 U.S. 208, 208–218 (1901) (reproducing complaint). One earlier case alleged that a low-lying bridge on a navigable river was a public nuisance because it obstructed river traffic. *See* Pennsylvania v. Wheeling & Belmont Bridge Co., 54 U.S. (13 How.) 518, 557 (1851). This dispute was resolved when Congress adopted legislation specifically authorizing maintenance of the bridge as a lawful post-road. *See* Pennsylvania v. Wheeling & Belmont Bridge Co., 59 U.S. (18 How.) 421, 429 (1855).

28. *See* New Jersey v. City of New York, 283 U.S. 473, 476–77 (1931); New Jersey v. New York, 283 U.S. 336, 341–42 (1931); New York v. New Jersey, 256 U.S. 296, 298 (1921); Georgia v. Tennessee Copper Co., 206 U.S. 230, 236 (1907); Missouri v. Illinois, 200 U.S. 496, 517 (1906). The Court considered two other cases during this era involving allegations that changes in interstate water flows had caused what was in effect an interstate nuisance. *See* Wisconsin v. Illinois, 278 U.S. 367, 399–400 (1929) (dealing with the diversion of water from Lake Michigan to the Chicago River, which was alleged to lower the level of the Great Lakes to the injury of lower riparian states); North Dakota v.

of these decisions were the first two, *Missouri v. Illinois*[29] and *Georgia v. Tennessee Copper Co.*[30]

Missouri's complaint against Illinois and its political subdivision, the Sanitary District of Chicago, challenged an ingenious plan to reverse the direction of the Chicago River, which previously had flowed into Lake Michigan, and make it flow instead away from the Lake, connecting through various canals and rivers until it eventually emptied into the Mississippi River forty-three miles above St. Louis.[31] Before the plan was launched, 1,500 pounds of raw sewage were discharged daily into the Chicago River, jeopardizing the city's water supply.[32] The District's plan would have solved Chicago's contaminated water supply problem by sending the raw sewage downstate in the direction of St. Louis.

In a preliminary decision rendered in 1901, the Court held that it had the authority to entertain and adjudicate the action.[33] Missouri was a proper plaintiff, because it was suing as *parens patriae* to abate a public nuisance which was allegedly jeopardizing its citizens' welfare.[34] Illinois was a proper defendant, because it had the power to enjoin its agent, the Sanitary District of Chicago, from committing such an alleged public nuisance.[35] Justice Shiras expressly analogized the situation of the two states to that of two nations under international law:

> If Missouri were an independent and sovereign State all must admit that she could seek a remedy by negotiation, and, that failing, by force. Diplomatic powers and the right to make war having been surrendered to the general government, it was to be expected that upon the latter would be devolved the duty of providing a remedy and that remedy, we think, is found in the constitutional provisions we are considering [providing for origi-

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Minnesota, 263 U.S. 365, 371–72 (1923) (concerning a dispute over transboundary flooding of river).

29. 200 U.S. 496.

30. 206 U.S. 230.

31. *See Missouri*, 200 U.S. at 517.

32. *See id.*

33. *See Missouri*, 180 U.S. at 241.

34. *See id.*

35. *See id.* at 242. Three Justices dissented on the ground that there was insufficient basis for attributing the alleged nuisance to acts taken by the State of Illinois, rather than the Sanitary District. *See id.* at 249–50 (Fuller, C.J., dissenting, joined by Harlan & White, JJ.).

> nal suits in the Supreme Court in disputes between two states].[36]

In so ruling, the Court in effect resolved the attribution question: Illinois, the source state, would be legally responsible if pollution emanating from its territory was found to cause an actionable public nuisance in Missouri.[37]

After an extensive factual investigation, the matter returned to the Court for decision on the merits some five years later.[38] Writing for a unanimous Court, Justice Holmes held that Missouri had failed to prove an actionable public nuisance, and the bill of complaint was dismissed.[39]

Holmes' opinion covers three subjects: the source of law governing the dispute, the legal principles to be gleaned from that law, and the application of those principles to the facts. The discussion of the first point is interesting, but a detailed consideration of it would take us too far afield. Essentially, Holmes concluded that the only possible source of law was the provision of the Constitution granting jurisdiction to the Court over such disputes, and the necessity of applying legal rules which would not be subject to revision by the legislatures of either state.[40] Holmes clearly did

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36. *Id.* at 241.

37. This aspect of the decision was reaffirmed in *Illinois v. City of Milwaukee*, 406 U.S. 91, 94–95 (1972).

38. *See* Missouri v. Illinois, 200 U.S. 496 (1906).

39. *See id.* at 526.

40. *See id.* at 519–20. A federal court's duty to decide a case properly within its jurisdiction, even if there is no applicable rule of decision supplied by federal or state law, probably provides the strongest justification for recognizing "federal common law." *See* Steven D. Smith, *Courts, Creativity, and the Duty to Decide a Case*, 1985 U. ILL. L. REV. 573, 581–82. *But see* Thomas W. Merrill, *The Judicial Prerogative*, 12 PACE L. REV. 327, 352–56 (1992) (questioning how often this rationale applies).

The need to resort to federal common law in the transboundary pollution context raised an even more vexing question, however, because under the Constitution as it was then interpreted, it was doubtful that Congress had the power to legislate on the subject of interstate water pollution. *Cf.* Kansas v. Colorado, 206 U.S. 46, 86–97 (1907) (indicating unanimously that Congress had no power to apportion waters in an interstate river, as opposed to regulating use of the river in the interest of navigation). Thus, the Court was placed in the uncomfortable position of announcing rules of decision which no legislative body could overturn. *See Missouri*, 200 U.S. at 520 (observing that a judicial decision in an area in which Congress had no power to regulate would be largely "irrevocable"). This particular difficulty was of course eventually overcome, as the Court came to view the powers of Congress much more broadly. By the time transboundary pollution disputes returned to the Court in the early 1970s, it was taken as a matter of course that Congress could revise decisions based on the federal common law of interstate pollu-

not like the implication that the Court, in such cases, "takes the place of [the] legislature," and for that reason he said that the Court should proceed with "great and serious caution."[41] In effect, doubts about the lawmaking authority of the Court were translated into a high burden of proof for the plaintiff state: "Before this court ought to intervene the case should be of serious magnitude, clearly and fully proved, and the principle to be applied should be one which the court is prepared deliberately to maintain against all considerations on the other side."[42]

Holmes then turned to the "principles of law" to be applied. The discussion of this point is set forth in one paragraph, which in the finest Holmesian style is at once richly suggestive and maddeningly oblique.[43] Holmes focused on the established practice along the Mississippi of permitting the discharge of untreated sewage into the river. This conventional practice, he stated, "offers a standard to which the defendant has the right to appeal;"[44] it also made it especially difficult to determine whether any injury was caused by sewage emanating from Chicago, as opposed to other discharges of untreated sewage, including those from Missouri cities.[45]

With this abbreviated discussion of the applicable legal principles, Holmes turned to the conflicting evidence submitted by the parties. The issue had narrowed to the question of whether typhoid bacteria contained in the sewage from Chicago were capable of surviving the arduous journey to St. Louis, some 357 river miles away.[46] The proofs developed by the parties make for fascinating reading, but were essentially inconclusive.[47] In the end, Holmes concluded that Missouri's evidence "falls so far below the allegations of the bill that it is not brought within the principles heretofore established in the cause."[48]

The question remains, however, just what were those principles? Generally speaking, ensuing courts and commentators have

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tion. *See Illinois*, 406 U.S. at 107.

41. 200 U.S. at 519, 520.

42. *Id.* at 521.

43. I will give further consideration to the import of this paragraph *infra* Part IV.

44. 200 U.S. at 522.

45. *See id.*

46. *See id.* at 523.

47. *See id.* at 523–25.

48. *Id.* at 526.

interpreted the cautionary remark that the case must be "of serious magnitude, clearly and fully proved,"[49] together with the extensive discussion about whether the sewage dumped in the Illinois River had resulted in an increase of typhoid in St. Louis, to mean that the plaintiff state must prove by "clear and convincing evidence" that it has suffered actual injury.[50] This conventional reading of *Missouri v. Illinois* is, in turn, the source of the second element of the consensus about the norms that govern transboundary pollution disputes; namely that state liability for transboundary pollution attaches only when such pollution is clearly proven to cause significant harm in the affected state.

Just one year after *Missouri v. Illinois*, the Court was confronted with another notable transboundary pollution case, *Georgia v. Tennessee Copper Co.*[51] For some years, three copper smelters operating in eastern Tennessee had employed a method of roasting ore in open piles. The roasting method emitted large quantities of sulphur fumes, damaging vegetation on nearby Tennessee hills and causing headaches and other physical symptoms among residents living in the vicinity.[52] This gave rise to state court litigation in which the Tennessee Supreme Court upheld a finding that the operations were a nuisance, but, after balancing the equities, denied injunctive relief and awarded the plaintiffs only modest damages.[53]

Meanwhile, the smelters turned from open pile to oven roasting, and one company located its oven very close to the Georgia state line.[54] When Georgia residents began complaining of the same injuries as the Tennessee plaintiffs, Georgia filed an original action in the Supreme Court on their behalf, naming the copper companies as defendants.[55] Georgia sought an injunction against continued operation of the ovens.[56]

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49. *Id.* at 521.

50. New York v. New Jersey, 256 U.S. 296, 309 (1921); *see also* Ann Woolhandler & Michael G. Collins, *State Standing*, 81 VA. L. REV. 387, 453 (1995) (observing that the heightened standard of proof is necessary in suits between states, although not in suits between private parties).

51. 206 U.S. 230 (1907).

52. *See* Madison v. Ducktown Sulphur, Copper & Iron Co., 83 S.W. 658, 659–60 (Tenn. 1904).

53. *See id.*

54. *See* Memorandum of Argument for Complainant Upon Final Hearing at 1–5, *Tennessee Copper*, 206 U.S. 230; *Tennessee Cooper*, 206 U.S at 238.

55. *See* 206 U.S. at 239.

56. *See* Original Bill of Complaint at 15–16, *Tennessee Copper*, 206 U.S. 230. The

Justice Holmes again wrote for the Court. In both tone and outcome, the decision was very different from *Missouri v. Illinois*. Holmes again stressed the differences between a suit by a state and a suit between private parties, but now he emphasized the state's right as a "*quasi*-sovereign" to be protected from unwanted intrusions upon its territory.[57] The four-page opinion devoted most of its consideration to whether it was appropriate to balance the equities in deciding whether to award injunctive relief for transboundary air pollution.[58] Concluding that "[t]his court has not quite the same freedom to balance the harm that will be done by an injunction against that of which the plaintiff complains, that it would have in deciding between two subjects of a single political power,"[59] Holmes found that an injunction would be the proper remedy, given a proven violation of the principles recognized in *Missouri v. Illinois*.[60]

As to what those principles were and why they had been shown to be satisfied, Holmes offered "but a few words."[61] He observed that it was not disputed that the defendants emitted sulphur fumes that were "carried by the wind great distances and over great tracts of Georgia land."[62] Without pausing "to go into details immaterial to the suit," Holmes announced that "we are satisfied by a preponderance of evidence that the sulphurous fumes cause and threaten damage on so considerable a scale to the forests and vegetable life, if not to health, within the plaintiff State as to make out a case within the requirements of *Missouri v. Illinois*."[63] There followed these somewhat mysterious words: "Whether Georgia by insisting upon this claim is doing more harm than good to her own citizens is for her to determine. The possi-

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case was originally filed in 1905, and the parties compiled a voluminous record at that time on the propriety of injunctive relief. Before the Court could rule, the defendants represented that they would install tall stacks on the ovens so as to minimize the harm. Georgia then voluntarily dismissed its complaint. The results of this modification proved unsatisfactory, however, and Georgia refiled its complaint two years later. *See Tennessee Copper*, 206 U.S. at 239. The parties thereupon agreed that the Court could decide the issue on the original record compiled in 1905. *See id.* at 236.

57. 206 U.S. at 237.
58. *See id.* at 237–39.
59. *Id.* at 238.
60. *See id.* at 239.
61. *Id.* at 238.
62. *Id.*
63. *Id.* at 238–39 (citation omitted).

ble disaster to those outside the State must be accepted as a consequence of her standing upon her extreme rights."[64]

Needless to say, *Tennessee Copper* is in some tension with *Missouri v. Illinois*. Both decisions focus on the sensitivities of the Court's role in adjudicating transboundary pollution disputes implicating the interests of two "quasi-sovereign" states. However, while *Missouri v. Illinois* seems to hold that these concerns require great caution before intruding upon the practices of the source state,[65] *Tennessee Copper* seems to hold that these concerns translate into the prerogative of the affected state to "stand upon . . . extreme rights" even if this means "possible disaster to those outside the State."[66]

Subsequent decisions and commentary have sought to reconcile the two decisions by positing that they establish a twofold legal regime.[67] First, *Missouri v. Illinois* adopts a high threshold for source state liability, requiring clear and convincing proof of significant injury in the affected state.[68] Second, *Tennessee Copper* provides that once this threshold is crossed, a rule of strict liability applies and the affected state is entitled to automatic injunctive relief against the continuance of such pollution.[69] *Tennessee Copper*, according to this view, thus answers the last two of the four questions posed by transboundary pollution: it establishes that the standard of care is one of strict liability and that the preferred remedy is automatic injunctive relief.

Although the Court decided three more transboundary pollution cases in the next two decades,[70] these decisions add little to the understanding of the elusive "principles" applied in *Missouri v. Illinois* and *Tennessee Copper*.[71] Starting in the 1940s, the states—with the Court's encouragement[72]—began to turn to inter-

64. *Id.* at 239.

65. *See* Missouri v. Illinois, 200 U.S. 496, 525–26 (1906).

66. *Tennessee Copper*, 206 U.S. at 239.

67. *See, e.g.*, North Dakota v. Minnesota, 263 U.S. 365, 373–74 (1924); Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1905, 1938 (1949); Malone, *supra* note 22, at 209–10; William A. Nitze, *Acid Rain: A United States Perspective, in* INTERNATIONAL LAW AND POLLUTION, *supra* note 7, at 329, 338.

68. *See supra* notes 49–50 and accompanying text.

69. *Tennessee Copper*, 206 U.S. at 239.

70. *See* New Jersey v. City of New York, 283 U.S. 473 (1931); New Jersey v. New York, 283 U.S. 336 (1931); New York v. New Jersey, 256 U.S. 296 (1921).

71. See *infra* Section IV.C for further discussion of these decisions.

72. *See* New York v. New Jersey, 256 U.S. at 313 ("We cannot withhold the sugges-

state compacts as a means of resolving transboundary pollution controversies.[73] Perhaps for this reason, the Court did not exercise original jurisdiction over any transboundary pollution cases during the middle three decades of the century.

With the advent of Earth Day in 1970 and the associated surge in public concern about environmental matters, renewed efforts were made to enlist the Supreme Court in resolving interstate pollution disputes. Ohio filed an original complaint in 1970 seeking abatement of mercury contamination of Lake Erie stemming from sources in Michigan and Canada;[74] Illinois filed suit in 1971 challenging sewage overflows into Lake Michigan from Milwaukee, Wisconsin.[75] Concerned about its competence to hear such suits and anxious to conserve its docket for other purposes,[76] the Court refused to exercise its original jurisdiction over these or other transboundary pollution disputes. Over the next two decades, the Court endorsed four different conceptions about how such controversies should be resolved, the only common theme being that further original suits in the Supreme Court were not acceptable. Specifically, the Court successively held: 1) that transboundary pollution is governed by the state common law articulated by the courts of the affected state;[77] 2) that it is governed by federal common law to be applied by federal district courts;[78] 3) that the federal common law has been superseded by federal statutes to be applied by the EPA;[79] and 4) to the extent not preempted by federal statutes, that transboundary pollution is governed by the state common law and statutory law of the source state.[80]

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tion . . . that the grave problem of sewage disposal . . . is one more likely to be wisely solved by cooperative study and by conference and mutual concession on the part of . . . the States so vitally interested in it than by proceedings in any court however constituted."); West Virginia *ex rel.* Dyer v. Sims, 341 U.S. 22, 27 (1951) (quoting same language).

73. *See infra* text accompanying notes 173–76.

74. *See* Ohio v. Wyandotte Chems. Corp., 401 U.S. 493 (1971) (declining to exercise jurisdiction).

75. *See* Illinois v. City of Milwaukee, 406 U.S. 91, 101 (1972) (finding that the federal district court had jurisdiction).

76. *See Illinois*, 406 U.S. at 93–94; *Wyandotte*, 401 U.S. at 497–99.

77. *See Wyandotte*, 401 U.S. at 505.

78. *See Illinois*, 406 U.S. at 98.

79. *See* City of Milwaukee v. Illinois, 451 U.S. 304, 312–15 (1981) (holding that no federal common law remedy for interstate water pollution is available given the comprehensive nature of the Clean Water Act).

80. *See* International Paper Co. v. Ouellette, 479 U.S. 481, 487–97 (1987) (holding

There is no indication that the Court envisioned any appreciable differences in the substantive content of these different sources of law. But each shift in the Court's understanding of the applicable law also shifted the task of developing the law governing such disputes to a different tribunal. The result, not surprisingly, is that no single adjudicative system has given the kind of sustained attention to the problem that is probably necessary if a coherent body of decisional law is to emerge. The principles tentatively sketched out in *Missouri v. Illinois* and *Georgia v. Tennessee Copper Co.* have therefore been cut off from further development. Transboundary pollution in the United States is today regulated almost exclusively by federal statutory law.[81]

2. *The* Trail Smelter *Arbitration.* Although frozen in time in the United States, the Supreme Court's original cases nevertheless live on as important precedents in international law. By far the most influential decision on transboundary pollution in international law is the *Trail Smelter* arbitration.[82] From the perspective of someone versed in U.S. law, the published views of a panel of three arbitrators chosen by the parties seems like a poor excuse for a leading precedent. Nevertheless, the *Trail Smelter* arbitration has assumed immense importance in the development of the customary international law on transboundary pollution, primarily because it is the only adjudicative decision of an international tribunal that speaks directly to the substantive law of transboundary pollution.[83]

The arbitration arose out of a controversy between the United States and Canada over sulphur fumes emitted by a smelter at Trail, British Columbia, which were blown by prevailing winds down the Columbia River valley into the northern part of the State of Washington. The dispute was initially submitted to the

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that the Clean Water Act pre-empts the common law of a state if that common law attempts to make a source in another state liable for the transboundary pollution).

81. *Missouri v. Illinois* and *Tennessee Copper* are still occasionally cited, but only insofar as they establish part of the background understanding for interpreting these statutes. *See, e.g.*, Arkansas v. Oklahoma, 503 U.S. 91, 98, 114 n.19 (1992) (describing the controversies in *Missouri v. Illinois* and *Tennessee Copper* as part of the history of Supreme Court adjudication of interstate water disputes).

82. Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1905, 1938 (1949).

83. *See* ALEXANDRE KISS & DINAH SHELTON, INTERNATIONAL ENVIRONMENTAL LAW 125, 361 (1991).

International Joint Commission (IJC) established by the Boundary Waters Treaty of 1909 between the United States and Canada.[84] The IJC (which has no binding powers of adjudication[85]) recommended that Canada pay $350,000 in indemnification to the U.S. for damages incurred through 1931.[86] The two countries eventually agreed to this recommendation, and also entered into a Convention establishing a special arbitration tribunal to determine "[w]hether damage . . . has occurred since the first day of January, 1932, and, if so, what indemnity should be paid therefor?"[87] If the preliminary answer to this question was yes, the tribunal was also to decide "whether the Trail Smelter should be required to refrain from causing damage in the State of Washington in the future and, if so, to what extent?"[88]

Implicit in Canada's agreement to pay $350,000 in indemnification for past damages, and in the phrasing of the questions to the tribunal by the Convention, was the understanding that the *parties* had agreed that Canada was responsible for any damages that could be proven.[89] In other words, the tribunal was not charged with determining any question of liability, only with fixing the proper remedy. After taking extensive evidence, the tribunal rendered a preliminary decision in 1938 finding Canada liable to the United States for a mere $78,000 in damages from 1932 to 1937.[90] Further evidence was taken, and the tribunal rendered a second decision in 1941 on the question of what prospective relief was appropriate.[91]

The 1941 decision approached the question of continuing relief as a question of law to be decided by ascertaining the nature of the legal duty that a source state owes to the affected state.[92] By framing the question this way, the tribunal in effect conflated the standard for awarding permanent relief with the standard for es-

84. Treaty Between the United States and Great Britain Relating to Boundary Waters Between the United States and Canada, Jan. 11, 1909, U.S.-Can., 36 Stat. 2448.

85. *See* Maxwell Cohen, *The Régime of Boundary Waters—The Canadian-United States Experience*, 146 RECUEIL DES COURS 219, 258 (1975).

86. *See Trail Smelter*, 3 R.I.A.A. at 1907.

87. *Id.* at 1908 (quoting the Convention for Settlement of Difficulties Arising from Operation of Smelter at Trail, B.C.).

88. *Id.*

89. *See* Rubin, *supra* note 22, at 263–64.

90. *See Trail Smelter*, 3 R.I.A.A. at 1933.

91. *See id.* at 1974, 1980.

92. *See id.* at 1963–64.

tablishing liability. This conflation had fateful consequences, for it allowed the tribunal to render a decision which had at least the appearance of an authoritative pronouncement on the content of the customary international law of transboundary pollution. Perhaps equally important, this approach launched the panel on a quest for the content of the international law "rule," assumed to be a general principle applicable to all transboundary pollution in all times and places.

The panel acknowledged that no decision of any international tribunal could be found dealing with transboundary air or water pollution.[93] The closest authorities on point were the original decisions of the U.S. Supreme Court—which the tribunal was obliged to follow in any event, since the Convention had specified that it was to apply U.S. law.[94] Nevertheless, the tribunal independently went out of its way to endorse these decisions as authoritative precedents in international law.[95]

The tribunal then proceeded to review the Supreme Court's transboundary pollution decisions, including *Missouri v. Illinois* and the "leading decision[]" in "the matter of air pollution itself," *Georgia v. Tennessee Copper Co.* After providing a lengthy quotation from *Tennessee Copper*, it offered the following oft-quoted summation of the law:

> The Tribunal, therefore, finds that the above decisions, taken as a whole, constitute an adequate basis for its conclusions, namely, that, under the principles of international law, as well as the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.[96]

The tribunal further concluded that Canada was responsible under international law for the Trail Smelter's pollution:

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93. *See id.* at 1963.

94. *See id.* at 1908 (quoting Convention) ("The Tribunal shall apply the law and practice followed in dealing with cognate questions in the United States of America as well as international law and practice . . . .").

95. *See id.* at 1964. The panel added the qualification that the U.S. decisions were authoritative provided "no contrary rule prevails in international law and no reason for rejecting such precedents can be adduced from the limitations of sovereignty inherent in the Constitution of the United States." *Id.* No such special limitations were identified.

96. *Id.* at 1965.

> [T]he Tribunal holds that the Dominion of Canada is responsible in international law for the conduct of the Trail Smelter. Apart from the undertakings in the Convention, it is, therefore, the duty of the Government of the Dominion of Canada to see to it that this conduct should be in conformity with the obligation of the Dominion under international law as herein determined.[97]

The *Trail Smelter* panel's restatement of U.S. and international law supports each of the three consensus elements of today's customary international law of transboundary pollution. First, the panel squarely held that "Canada is responsible in international law for the conduct of the Trail Smelter."[98] A source state thus may not "permit the use of its territory" for injurious transboundary pollution.[99] Second, in accordance with the tribunal's reading of the Supreme Court opinions, liability will attach only when "the case is of serious consequence and the injury is established by clear and convincing evidence."[100] Third, the panel implied that liability is strict, provided the requisite causation is shown: "no State has the right . . . to cause injury by fumes in or to the territory of another or the properties or persons therein."[101]

International law publicists are divided about the authority of *Trail Smelter* as a source of international customary law. Some find that the decision, especially when supplemented by other less clearly applicable precedents such as the *Lake Lanoux* arbitration[102] and the *Corfu Channel* case,[103] directly supports the conclusion that source states are strictly liable for pollution that directly causes significant injury in another state.[104] Others believe

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97. *Id.* at 1965–66.
98. *Id.* at 1965.
99. *Id.*
100. *Id.*
101. *Id.*
102. Affaire du Lac Lanoux (Spain v. Fr.), 12 R.I.A.A. 281, 314–317 (Trib. Arb. 1957) (apportioning water in river flowing from France into Spain and cautioning against changes in water quality that might cause injury to Spanish interests).
103. Corfu Channel Case (U.K. v. Alb.), 1949 I.C.J. 4, 15–23 (holding Albania legally responsible for damage to British warships from mines placed in Albanian waters presumably with Albania's knowledge).
104. *See, e.g.*, SPRINGER, *supra* note 4, at 133–134; L.F.E. Goldie, *International Principles of Responsibility for Pollution*, 9 COLUM. J. TRANSNAT'L L. 282, 306–07 (1970); Gunther Handl, *Paying the Piper for Transboundary Nuclear Damage: State Liability in a System of Transnational Compensation*, *in* INTERNATIONAL LAW AND POLLUTION, *supra*

that the issue of liability was not directly before the arbitration panel, and therefore that its statement on this point was dictum.[105] This division among publicists, however, is confined largely to the question of the authoritativeness of the *Trail Smelter* decision.[106] Whether the tribunal was correct in its assumption that the "true" customary international rule takes the form of a universal principle, and whether the content of that principle entails some form of strict liability, has engendered relatively little dissent.[107]

3. *Modern Declarations of "Soft" International Law.* Authoritative or not, the *Trail Smelter* decision has been extremely influential in the formulation of numerous official and semi-official international charters, declarations, and statements of principle dealing with transboundary pollution. Although these materials are not directly binding on nation-states, they are nevertheless regarded as important indicia of the requirements of customary international law. By and large, this "soft" international law[108]

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note 7, at 150, 162; *see also* Constance O'Keefe, *Transboundary Pollution and the Strict Liability Issue: The Work of the International Law Commission on the Topic of International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law*, 18 DENV. J. INT'L L. & POL'Y 145, 174–76 (1990) (discussing impact of case).

105. *See, e.g.*, Rubin, *supra* note 22, at 264 ("[T]he liability of Canada for 'damage' [was] assumed."); Joni S. Charme, *Transnational Injury and Ultra-Hazardous Activity: an Emerging Norm of International Strict Liability*, 4 J.L. & TECH. 75, 86 (1989) ("[C]lose examination reveals a failure on the part of the tribunal to . . . address . . . liability, precisely because the suit was characterized as one implicating the law of nuisance."); Edith Brown Weiss, *Who Pays for Weather Modification Damage?* 4 ENV. POL'Y & L. 22, 23 (1978) ("[L]iability was not an issue.").

106. For what it is worth, I believe that those who argue for the authoritativeness of the *Trail Smelter* arbitration are correct. It is true that the only issue before the tribunal was the proper remedy for Canada's pollution. But given the panel's premise that a permanent injunction would be appropriate only if Canada was subject to a duty under international law not to engage in such pollution, *see supra* text accompanying notes 89–101, the panel's determination of whether there was such a duty was necessary to its decision and hence was not dictum.

107. *But see* BIRNIE & BOYLE, *supra* note 23, at 142–47 (arguing that actual state practice, as opposed to soft law declarations, supports a general due diligence requirement only). More commonly, publicists object to the *Trail Smelter* formulation on the ground that it failed to adopt a standard of strict liability that is strict enough to handle modern environmental problems. The limitation to "serious" injury proven by clear and convincing evidence has been the special focus of attack. *See, e.g.*, Rubin, *supra* note 22, at 276–78 (criticizing *Trail Smelter* for allowing money damages only if it is shown that emissions do tangible injury).

108. On the widespread use of "soft" law in shaping international environmental

carries forward the *Trail Smelter* tribunal's basic strategy: these sources seek to articulate a statement of universal principle governing all transboundary pollution; they focus on the issue of causation of a given quantum of harm in another state; and they imply, but do not explicitly state, a standard of strict liability for all transboundary pollution above the harm threshold.

A number of authoritative pronouncements embody this approach.[109] Without a doubt the most famous is the Stockholm Declaration of 1972, which provides in its Principle 21 that states have "the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."[110] This language is widely viewed as reflecting the precedent established by the *Trail Smelter* arbitration.[111] Although it

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norms, see Peter H. Sand, *Lessons Learned in Global Environmental Governance*, 18 B.C. ENVTL. AFF. L. REV. 213, 239–40 (1991) (arguing that while "soft" laws can take instant effect because they are not subject to national ratification, their lack of formality makes them inherently vulnerable to public attack).

109. *See, e.g.*, Final Report of the Experts Group on Environmental Law on Legal Principles for Environmental Protection and Sustainable Development, art. 10, *in* EXPERT GROUP ON ENVIRONMENTAL LAW OF THE WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT 75 (1987) (endorsing the principle that "States shall . . . prevent or abate any transboundary environmental interference or a significant risk thereof which causes substantial harm—i.e. harm which is not minor or insignificant"); Rules on International Law Applicable to Transfrontier Pollution, art. 3, Sept. 4, 1982, 60 I.L.A. 158, 160 (1982) (arguing that states are "under an obligation to prevent, abate and control transfrontier pollution to such an extent that no substantial injury is caused in the territory of another State"); Stockholm Declaration of the United Nations, June 16, 1972, Conference on the Human Environment, 11 I.L.M. 1416 (1972) [hereinafter Stockholm Declaration]; Helsinki Rules on the Uses of the Waters of International Rivers, art. 10, Aug. 20, 1966, 52 I.L.A. 484, 496–97 (1966) (providing that every state located on an international drainage basin "must prevent any new form of water pollution or any increase in the degree of existing water pollution in an international drainage basin which would cause substantial injury in the territory of a co-basin State"); RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES § 601(1) (1987) (concluding that a state "is obligated to take such measures as may be necessary, to the extent practicable under the circumstances, to ensure that activities within its jurisdiction or control . . . are conducted so as not to cause significant injury to the environment of another state or of areas beyond the limits of national jurisdiction").

110. Stockholm Declaration, *supra* note 109, at 1420; *see also* Louis B. Sohn, *The Stockholm Declaration on the Human Environment*, 14 HARV. INT'L L.J. 423, 492–93 (1974) (discussing background of Principle 21 and stressing the importance of the second part, which limits states' rights to exploit natural resources to those uses which do not damage others).

111. *See* AMERICAN SOC'Y OF INT'L L., PROCEEDINGS OF THE 77TH ANNUAL MEETING 433–35 (1985).

does not expressly use the words "strict liability" or their equivalent, it is widely regarded as endorsing the principle of state responsibility for all activities that cause the requisite "damage to the environment" beyond their territory.[112] Principle 21, in turn, has been reaffirmed in numerous other charters and declarations,[113] including the 1992 Rio Declaration on Environment and Development.[114]

In summing up the customary international law of transboundary pollution, contemporary publicists frequently say that it adopts the maxim *sic utere tuo ut alienum non laedas*.[115] To be sure, neither the *Trail Smelter* decision nor the Supreme Court's original jurisdiction decisions use this phrase. Further, the maxim has largely disappeared from the common law of nuisance, because it is widely recognized to be question-begging.[116] Nevertheless, the *sic utere* formula evidently has considerable utility for international law publicists, because it suggests a norm of strict liability without expressly saying so. Indeed, this approach seems to capture the dominant strategy of the international environmental law community: pushing for *de facto* endorsements of the principle of strict liability for transboundary pollution under a cloak of ambiguity, in the hope of building a consensus for staunch environmental obligations while minimizing the risk that states will rebel against the implications of those obligations.[117]

Occasionally one encounters a departure from the general strategy of promoting a universal norm of strict liability for significant transboundary pollution. Of particular note is the

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112. *See* BIRNIE & BOYLE, *supra* note 23, at 92–98; Pierre-Marie Dupuy, *Overview of the Existing Customary Legal Regime Regarding International Pollution*, *in* INTERNATIONAL LAW AND POLLUTION, *supra* note 7, at 61, 63–64.

113. *See* COVEY T. OLIVER ET AL., THE INTERNATIONAL LEGAL SYSTEM 442–443 (1995) (listing reaffirmations).

114. *See* Rio Declaration on Environment and Development, U.N. Doc. A/Conf. 151/26 (1992), *reprinted in* 31 I.L.M. 874, 876 (1992) (Principle 2).

115. *See, e.g.*, Note, *Developments in the Law—International Environmental Law*, 104 HARV. L. REV. 1484, 1496–97 (1991); O'Keefe, *supra* note 104, at 162–63, 175–76. The maxim is translated as "one should use his own property in such a manner as not to injure that of another." BLACK'S LAW DICTIONARY 1380 (6th ed. 1990).

116. *See* Hale v. Farmers Elec. Membership Corp., 99 P.2d 454, 456 (N.M. 1940) (holding that *sic utere* is a good moral precept, but useless as a legal maxim, since it determines no right and defines no obligation).

117. For an enlightening account of the convoluted deliberations of the International Law Commission in seeking a formula for state liability that does not use the "dreaded" phrase "strict liability," see O'Keefe, *supra* note 104, at 178–85.

OECD Council Recommendations on Principles Concerning Transfrontier Pollution, adopted in 1974.[118] After tipping its hat in the direction of the Stockholm Declaration,[119] the Council urged that transboundary pollution disputes be resolved on the basis of what it called a "principle of non-discrimination."[120] Under this principle, the source states should agree to control transboundary pollution to levels considered acceptable in comparable circumstances in the source state itself, and should agree to afford the same rights in judicial and administrative proceedings to persons in an affected state as to persons in the source state.[121] The OECD Principles thus reflect a very different strategy for dealing with transboundary pollution—one that eschews a universal standard of conduct in favor of norms embedded in the practices of the affected parties, and designed to promote a spirit of reciprocity rather than an abstract environmental ideal. The alternative approach reflected in the OECD Principles, however, has been largely drowned out in the chorus of approval for the strict liability approach of the *Trail Smelter* arbitration and the Stockholm Declaration.[122]

4. *United States Statutory Law.* Within the federal system of the United States, comprehensive environmental statutes have superseded common law liability. Nevertheless, the principal statutes dealing with transboundary pollution—the Clean Air Act and the Clean Water Act—embody the same understanding reflected in customary international law: source states should be

118. *See* Organization for Economic Co-operation and Development, Council Recommendation on Principles Concerning Transfrontier Pollution, Nov. 14, 1974, 14 I.L.M. 242 (1975) [hereinafter OECD Recommendation].

119. *See id.* at 243.

120. *See id.* at 244–45.

121. *See id.*

122. Besides the OECD Council, two other sources in the 1970s also endorsed equal access provisions, a type of reciprocity principle. *See* United Nations Environment Program: Draft Principles of Conduct in the Field of the Environment for Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States, Principle 14, May 19, 1978, 17 I.L.M. 1097, 1099 (1978); Joel A. Gallob, *Birth of the North American Transboundary Environmental Plaintiff: Transboundary Pollution and the 1979 Draft Treaty for Equal Access and Remedy*, 15 HARV. ENVTL. L. REV. 85 (1991) (discussing Joint Working Group on the Settlement of International Disputes, Draft Treaty on a Regime of Equal Access and Remedy in Cases of Transfrontier Pollution (1979)).

held strictly liable for interstate pollution that causes significant harm in an affected state.

The Clean Air Act requires each state to adopt an implementation plan designed to achieve certain air quality standards. According to section 110(a)(2)(D), each implementation plan must prohibit "any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will . . . contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to" air quality standards.[123] This requirement is a fairly precise restatement of the three consensus elements reflected in international customary law: the source state is made legally responsible for emissions activity within its jurisdiction that has an extraterritorial effect; the source state will be held liable if emissions "contribute significantly" to noncompliance with air quality standards in any other state; once this threshold is reached, the legal liability of the source state is strict—it must prohibit "any" source from emitting "any" pollutant that interferes with compliance in "any other" state. Section 110(a)(2)(D)'s statement of the applicable legal standard is reinforced by a procedural mechanism set forth in section 126. This section authorizes "[a]ny State or political subdivision" to petition the EPA for "a finding that any major source or group of stationary sources [in another state] emits or would emit any air pollutant" in violation of the substantive standard of section 110(a)(2)(D).[124] If such a finding is rendered, new sources that

123. 42 U.S.C. § 7410(a)(2)(D)(i) (1994).

124. 42 U.S.C. § 7426(b). Actually, after the 1990 amendments to the Clean Air Act, section 126(b) contains what appears to be a typographical error which, if read literally, would render the EPA's obligation to make such a finding meaningless. As now written, section 126(b) permits affected states to petition the EPA for a finding that a source state is "in violation of the prohibition of section 7410(a)(2)(D)(ii) of this title . . . . " Section 7410(a)(2)(D)(ii), in turn, states that every state implementation plan must insure "compliance with the applicable requirements of [section 126]." Together, the two provisions simply refer to each other, and neither sets forth a substantive obligation. The substantive obligation to protect downwind states is contained in section 7410(a)(2)(D)(i), which is not referred to in section 126(b). Prior to the 1990 amendments, section 126(b) correctly cross-referenced to subparagraph (i), not (ii). *See* 42 U.S.C. § 7426(b) (1988). Presumably, the EPA and the courts will disregard the typographical error, either on the ground that when read in context the "true meaning" of "section 7410(a)(2)(D)(ii)" is "section 7410(a)(2)(D)(i)," *see* National Bank of Oregon v. Insurance Agents, 508 U.S. 439, 462 (1993) (holding that courts should "'disregard the punctuation, or repunctuate, if need be, to render the true meaning of the statute'" when there is "overwhelming evidence" from the structure, language, and subject matter of an act that the punctuation in

would violate the standard may not be constructed or operated and existing sources must reduce their emissions to permit the affected state to come into compliance with the standard "as expeditiously as practicable, but in no case later than three years after the date of such finding."[125]

The Clean Air Act also provides a mechanism for addressing international transboundary pollution, under a type of strict liability. The mechanism, set forth in section 115, is based on international reciprocity: it applies to any foreign country that provides "essentially the same rights" to the United States.[126] When the Administrator of the EPA receives a report from a "duly constituted international agency" that emissions of air pollution from the United States "may reasonably be anticipated to endanger public health or welfare in" a reciprocating foreign country, the Administrator "shall" notify the governor of the state in which such emissions originate of the need to revise the applicable state implementation plan so as to "prevent or eliminate the endangerment."[127]

The Clean Water Act, at least as interpreted by the EPA, also establishes what is in effect a rule of strict liability for significant transboundary pollution. While the text of the Act itself sends a rather garbled message about transboundary pollution,[128] since

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question is a typographical error (citation omitted)); or on the ground that the plain meaning leads to an absurd result, *see* Green v. Bock Laundry Mach. Co., 490 U.S. 504, 509–10 (1989) (rejecting a literal interpretation of FED. R. EVID. 609(a) because it "would compel an odd result").

125. 42 U.S.C. § 7426(c). The 1990 amendments to the Clean Air Act seek to beef up the enforcement of the interstate pollution limitations by providing for the creation of a number of interstate transport commissions. *See* 42 U.S.C. § 7506a(b) (providing for interstate transport commissions to make recommendations to the EPA about measures to achieve compliance with section 7410(a)(2)(D)); 42 U.S.C. § 7511c (creating special interstate air commission for ozone comprising states in northeastern United States); 42 U.S.C. § 7492(c) (providing for interstate transport commissions to address degradation of visibility in pristine areas). It remains to be seen whether these commissions will have a significant impact on the control of interstate air pollution under the Act. In 1995, the EPA, acting on the recommendation of the Northeast Ozone Transport Commission established pursuant to 42 U.S.C. § 7511c, ordered twelve states in the Northeast and the District of Columbia to adopt the stricter "California" auto emissions standards in order to reduce transboundary ground level ozone in the region. The D.C. Circuit recently invalidated this order as exceeding the EPA's statutory authority. *See* Virginia v. EPA, 44 Env't Rep. Cas. (BNA) 1129 (D.C. Cir. Mar. 11, 1997).

126. 42 U.S.C. § 7415(c).

127. 42 U.S.C. § 7415(a), (b).

128. The Act requires that point sources of water pollution obtain permits establishing effluent limitations, and also requires the states to establish water quality standards for different bodies of water pursuant to EPA regulatory guidelines. *See* 33 U.S.C. § 1311

1973 the EPA has interpreted the Act to mean that a permit may not be issued to a point source of pollution in a source state "[w]hen the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected States."[129] In *Arkansas v. Oklahoma*,[130] the Supreme Court upheld this regulation as a permissible agency interpretation of the statute under the *Chevron* doctrine.[131] The Court also upheld the EPA's understanding that not every migration of pollutants from the source state to the affected state is prohibited by this rule, only those that lead to a "detectable violation" of the affected state's water quality standards.[132] The resulting regime is very close to a rule of strict liability for all significant or substantial transboundary pollution.

B. *Transboundary Pollution—Legal Reality*

When we look beneath the surface of the foregoing international declarations and domestic statutes, the "law in action" with respect to transboundary pollution reflects something considerably

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(effluent limitations); *id.* § 1313 (water quality standards). The effluent limitations are intended, among other things, to assure compliance with the water quality standards. *See id.* § 1311. Section 402 of the Act establishes the permitting system, called the National Pollutant Discharge Elimination System (NPDES). *See id.* § 1342(a). Such permits may be issued either by the EPA or by a state agency that meets certain federal requirements. *See id.* § 1342(a), (b). With respect to possible transboundary pollution effects, section 402 merely requires that potentially affected states receive notice and an opportunity to submit written recommendations before a permit is issued in a source state. *See* 33 U.S.C. § 1342(b)(5); *see also* City of Milwaukee v. Illinois, 451 U.S. 304, 325–26 (1981) (describing section 402(b)(5) as reflecting only a requirement of notice and an opportunity to submit written recommendations). However, section 401 of the Act provides that before any person may receive a *federal* license or permit to discharge pollutants, the EPA must be satisfied that the discharge will not interfere with any other state's compliance with water quality standards. *See id.* § 1341(a)(2). It is unclear from the face of the statute whether Section 401 was intended to apply to federal permits issued under the NPDES system, and if so, whether the same requirement applies to NPDES permits issued by the states rather than the federal government. *See id.* § 1341. In *Arkansas v. Oklahoma*, 503 U.S. 91 (1992), the Supreme Court held that the EPA could interpret section 401 as applying to federal NPDES permits; it expressly declined to reach the question whether section 401 applies to state NPDES permits. *See id.* at 104, 107.

129. 40 C.F.R. § 122.4(d) (1996).

130. 503 U.S. 91 (1992).

131. *See id.* at 107; *see also* Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 843–44 (1984) (holding that unless an administrative agency's construction of a statutory scheme is "arbitrary, capricious, or manifestly contrary to the statute," a court should give controlling weight to the interpretation).

132. Arkansas v. Oklahoma, 503 U.S. at 109–11.

less impressive than suggested by the official accounts. As one author has observed, "To say that a state has no right to injure the environment of another seems quixotic in the face of the great variety of transborder environmental harms that occur every day."[133]

1. *Adjudications.* The most glaring evidence of the disparity between legal doctrine and legal reality is the dearth of individual adjudications enforcing any standard of liability for transboundary pollution, strict or otherwise. In international law, the *Trail Smelter* arbitration, which was established by a bilateral convention between Canada and the United States, stands virtually alone.[134] The most prominent attempt since *Trail Smelter* to adjudicate a transboundary pollution dispute under international law occurred in 1973, when New Zealand and Australia filed complaints with the International Court of Justice (ICJ) asking it to declare that French nuclear-weapons testing in the Pacific unlawfully threatened downwind populations with radioactive fallout.[135] France refused to appear in response to the complaint. When the ICJ proceeded to grant certain interim relief,[136] France ignored the order. Later, when France indicated that it had completed its atmospheric testing program for the time being, the ICJ beat a strategic retreat and declared the controversy moot.[137]

Since then, there have been several highly publicized episodes of serious transboundary pollution, but none has resulted in an international adjudication of state liability. Although the explosion and fire at the Chernobyl nuclear reactor in 1985 caused signifi-

133. Oscar Schachter, *The Emergence of International Environmental Law*, 44 J. INT'L AFF. 457, 463 (1991). *See also* Daniel Bodansky, *Customary (and not so Customary) International Environmental Law*, 3 IND. J. GLOBAL L. STUD. 105, 110–11 (1995).

134. *See generally* Bodansky, *supra* note 133, at 114 (*Trail Smelter* "[s]till the only case in which a state was held internationally responsible for causing transboundary harm."); Note, *supra* note 115, at 1496–1501 (noting the scarcity of noteworthy decisions, their limited precedential value, and the resultant stifling of doctrinal development); Rubin, *supra* note 22, at 259 (observing that *Trail Smelter* is the only precedent cited in RESTATEMENT (SECOND) OF THE FOREIGN RELATIONS OF THE UNITED STATES on a state's liability to another in connection with pollution).

135. *See* Nuclear Tests, (N.Z. v. Fr.), 1974 I.C.J. 457 (Dec. 20); Nuclear Tests (Austl. v. Fr.), 1974 I.C.J. 253 (Dec. 20); *see generally* Jerome B. Elkind, *French Nuclear Testing and Article 41—Another Blow to the Authority of the Court?*, 8 VAND J. TRANSNAT'L L. 39–45 (1974) (describing backgronnd of the controversy).

136. *See* Nuclear Tests (Austl. v. Fr.), 1973 I.C.J. 99, 135.

137. *See* Nuclear Tests (Austl. v. Fr.), 1974 I.C.J. 253, 272.

cant increases in radioactivity levels in more than twenty downwind states and resulted in losses of million of dollars in condemned agricultural products, no state brought suit against the Soviet Union seeking compensation.[138] The next year, a major chemical spill into the Rhine River by the Sandoz Chemical Company in Switzerland caused extensive damage to the river and its resources in downstream states.[139] But again, no downstream state sought any remedy under international law against Switzerland for these damages.[140] As one commentator ruefully observed after reviewing this record, "[p]ublicists' efforts at codifying standards of conduct notwithstanding, international liability remains an empty abstraction."[141]

Attempts to secure relief under U.S. law have fared little better. Although the Clean Air Act forbids any pollution that will "contribute significantly" to an affected state's nonattainment of air quality standards,[142] no state has ever succeeded in obtaining relief under section 126 for pollution emanating in another state.[143] The courts have upheld the EPA's steadfast refusal to act against interstate air pollution, sometimes affirming the EPA's discretion to adopt narrow interpretations of its statutory obligations,[144] and in other cases deferring to the EPA's technical expertise in finding inadequate proof of an interstate effect.[145]

The international transboundary pollution provision of section 115 of the Clean Air Act has also proven to be a dead letter. For example, Canada has complained for years about acid rain which it contends is predominantly caused by transboundary pollution

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138. *See* PHILIPPE SANDS, CHERNOBYL: LAW AND COMMUNICATION 1–2, 27 (1988); Ellen B. Moynagh, Comment, *The Legacy of Chernobyl: Its Significance for the Ukraine and the World*, 21 B.C. ENVTL. AFF. L. REV. 709, 712–22 (1994).

139. *See* Aaron Schwabach, Comment, *The Sandoz Spill: The Failure of International Law to Protect the Rhine from Pollution*, 16 ECOLOGY L.Q. 443, 445–48 (1989).

140. *See* Note, *supra* note 115, at 1500.

141. *Id.* at 1499–1500.

142. *See* 42 U.S.C. § 7410(a)(2)(D) (1994).

143. *See* New York v. United States, 852 F.2d 574, 581 (D.C. Cir. 1988) (R.B. Ginsburg, J., concurring); Revesz, *supra* note 4, at 2362–74; Kay M. Crider, Note, *Interstate Air Pollution: Over a Decade of Ineffective Regulation*, 64 CHI.-KENT L. REV. 619, 633 (1988).

144. *See New York*, 852 F.2d 574; Connecticut v. United States EPA, 656 F.2d 902 (2d Cir. 1981).

145. *See* Air Pollution Control Dist. v. EPA, 739 F.2d 1071, 1093 (6th Cir. 1984); New York v. United States EPA, 716 F.2d 440, 444 (7th Cir. 1983); New York v. United States EPA, 710 F.2d 1200, 1204 (6th Cir. 1983).

emanating from the United States.[146] In early 1981, it looked as though Canada might obtain relief. The IJC, concededly a "duly constituted international agency," found that pollutants emitted in the United States were causing acid rain in Canada.[147] Douglas Costle, Administrator of the EPA in the outgoing Carter Administration, responded by issuing a letter pursuant to section 115 concluding that acid rain from United States sources was endangering health and welfare in Canada.[148] However, Administrator Costle's successors, who were appointed by President Reagan, did not believe that this letter bound them to take any further action. Their inaction was sustained by the D.C. Circuit, which ruled that the Costle letter was procedurally defective.[149] Canada subsequently filed a formal petition requesting the institution of a rulemaking proceeding to implement the findings in Costle's letter. The EPA rejected the petition, on the ground that the Clean Air Act did not require that any action be taken until the precise sources of the pollution in the United States could be identified.[150] The D.C. Circuit then upheld this narrow interpretation of the Act as a permissible exercise of agency discretion.[151]

The consistent losing streak of plaintiff states and nation-states under the Clean Air Act suggests that even express statutory causes of action for transboundary pollution are of limited utility. If the executive branch is unenthusiastic about granting relief to an affected state complaining about transboundary pollution, it appears that the courts are unlikely to intercede and force the executive's hands.

The EPA's Clean Water Act regulation, which forbids point sources from emitting discharges that result in a violation of water quality standards in another state,[152] has also resulted in very little reported administrative or judicial action.[153] In *Arkansas v.*

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146. *See* JOHN E. CARROLL, ENVIRONMENTAL DIPLOMACY: AN EXAMINATION AND A PROSPECTIVE OF CANADIAN-U.S. TRANSBOUNDARY ENVIRONMENTAL RELATIONS 239–74 (1983).

147. *See* The Queen *ex rel.* Ontario v. United States EPA, 912 F.2d 1525, 1529 (D.C. Cir. 1990); Thomas v. New York, 802 F.2d 1443, 1445 (D.C. Cir. 1986).

148. *See* The Queen *ex rel.* Ontario v. United States EPA, 912 F.2d at 1529.

149. *See Thomas*, 802 F.2d at 1446. ("[W]hatever the impact of Administrator Costle's letter, it cannot serve as a basis for judicial relief.")

150. *See* The Queen *ex rel.* Ontario v. United States EPA, 912 F.2d at 1533–34.

151. *See id.* at 1534.

152. 40 C.F.R. § 122.44(d)(4) (1996); *see also supra* note 128.

153. *See, e.g., infra* note 231.

Oklahoma,[154] the Supreme Court upheld the EPA's factual finding that discharges from a new sewage treatment plant in Arkansas, located thirty-nine miles upstream from the Oklahoma state line, would not result in a detectable violation of water quality standards in Oklahoma.[155] Oklahoma's failure to secure relief for transboundary water pollution was not unique. There are very few reported decisions in which the EPA has granted relief to a downstream state whose water quality standards have been jeopardized by an upstream source.[156]

2. *Treaties and Compacts.* When we turn from adjudications of transboundary pollution disputes to bilateral and multilateral treaties and compacts dealing with transboundary pollution, the record is somewhat more encouraging. A handful of treaties and interstate compacts adopt meaningful regulation of transboundary pollution. The successful treaties and compacts do not, however, adopt any kind of centralized, universal adjudicatory mechanism based on strict liability (or any other standard of care). Rather, they incorporate specific limitations on discharges of pollutants. Moreover, the small number of success stories are far outnumbered by the failures to achieve any kind of effective regime for collective control of transboundary pollution.

a. Agreements establishing liability regimes. In contrast to the ringing denunciations of transboundary pollution that are found in United Nations declarations and other "soft" law, very few legally binding treaties incorporate the strict liability conception of the *Trail Smelter* panel.[157] The most prominent liability treaties that

154. 503 U.S. 91 (1992).

155. *See id.* at 111–12.

156. *But see* Champion Int'l Corp. v. EPA, 648 F. Supp. 1390 (W.D.N.C. 1986) (holding that the EPA may take over permitting authority from North Carolina in part because the state failed to modify proposed permit to assure compliance with Tennessee water quality standards), *rev'd, vacated and remanded*, 850 F.2d 182 (4th Cir. 1988) (holding that although "EPA has acted properly," the case should be dismissed for lack of subject matter jurisdiction); *cf.* City of Albuquerque v. Browner, 865 F.Supp. 733, 741–42 (D.N.M. 1993) (questioning whether water quality standards approved for a downstream state would result in unfeasible discharge limits for an upstream state, but noting that the issue was not before the court).

157. *See* JAN SCHNEIDER, WORLD PUBLIC ORDER OF THE ENVIRONMENT: TOWARDS AN INTERNATIONAL ECOLOGICAL LAW AND ORGANIZATION 168–71 (1979) (reviewing treaties that provide for strict liability); *see also* L.F.E. Goldie, *Development of an International Environmental Law—An Appraisal*, *in* LAW, INSTITUTIONS & THE GLOBAL ENVI-

could apply to transboundary pollution are the Paris and Vienna Conventions on civil liability for nuclear damage, which impose "absolute" liability for injuries caused by releases from nuclear reactors, subject to narrow defenses.[158] The former is a regional treaty that applies only in Europe; the latter is global but has been ratified by only fourteen nations. Both treaties have very low limits on liability,[159] and neither has apparently ever been invoked.

The only other transboundary liability treaty of note is the 1974 Nordic Convention, which incorporates a reciprocity rule permitting the citizens of each signatory state (Denmark, Finland, Norway, Sweden) to sue in the courts of any other state for compensation based on transboundary pollution.[160] It appears, however, that this provision also has never been invoked.[161] Several other conventions mention liability, but either in vague terms with no institutional mechanism for implementation[162] or as a promise to be fleshed out by future protocols which have apparently never been adopted.[163]

RONMENT 104, 135–39 (John Lawrence Hargrove ed., 1972); O'Keefe, *supra* note 104, at 170–74. Several treaties besides those mentioned in the text adopt something akin to strict liability for "ultrahazardous activities" like nuclear accidents or oil spills, but they apply to releases into a commons like the oceans or outer space. *See* Convention on the Liability of Operators of Nuclear Ships, May 25, 1962, art. II(1), 57 AM. J. INT'L L. 268 (1963) (calling for strict liability for nuclear damage caused by certain ships); Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, art. II, 961 U.N.T.S. 187 [hereinafter Space Objects Convention] (calling for strict liability for damage caused by space objects falling to earth); International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, Art. III(1), 973 U.N.T.S. 3 (calling for strict liability for pollution damage caused by ship's oil discharge). As noted in Section II.A, *infra*, I regard the problem of pollution of a commons as distinct from transboundary pollution; hence I have not included these treaties as examples of transboundary pollution regulation.

158. *See* Vienna Convention on Civil Liability for Nuclear Damage, May 21, 1963, art. IV(1), 2 I.L.M. 727 (1968); Convention on Third Party Liability in the Field of Nuclear Energy, July 29, 1960, art. 3, 956 U.N.T.S. 251 (1974).

159. *See* U.N. CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, THE EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL AGREEMENTS 401–02 (1992).

160. *See* Convention on the Protection of the Environment, Feb. 19, 1974, 1092 U.N.T.S. 279.

161. *See* Gallob, *supra* note 122, at 108–10.

162. *See* Treaty of the La Plata River and its Maritime Limits, Nov. 19, 1973, Arg.-Uru., art. 51, 13 I.L.M. 251.

163. *See* Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, Nov. 25, 1986, art. 20, 26 I.L.M. 38, 49 (1987).

b. Agreements establishing specific pollution limitations. Of greater significance are a number of treaties and compacts that adopt substantive regulatory limits on specific kinds of transboundary pollution or in which the parties agree on specific controls to prevent certain types of transboundary pollution. The most important of these agreements concerns the most pervasive form of transboundary pollution—acid rain. Acid rain, like transboundary pollution in general, has been notoriously resistant to effective regulation, both internationally and within a federal system like the United States.[164] In recent years, however, substantive limitations on emissions of the precursor gases responsible for acid rain have been achieved in both Europe and the United States.

In Europe, significant collective action against acid rain has been realized through successive revisions of the Long-Range Transboundary Air Pollution Convention (LRTAP).[165] In the United States, Congress added a new subtitle to the Clean Air Act in 1990 after a decade of contentious debate.[166] Under both the LRTAP and the 1990 Clean Air Act regimes, the final regulations include arbitrary cutbacks in levels of sulfur dioxide emissions—initially a 30% reduction from 1980 baseline levels in Europe,[167] and a reduction of 10 million tons from 1980 baseline

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164. *See* JUTTA BRUNEE, ACID RAIN AND OZONE LAYER DEPLETION: INTERNATIONAL LAW AND REGULATION 81–141 (1988) (examining international regulatory responses to acid rain); MARSHALL E. WILCHER, THE POLITICS OF ACID RAIN 11–71 (1989) (discussing acid rain policies in Canada, Great Britain, and the United States); J. Wallace Malley, Jr., *Acid Rain: A Decade of Footdragging May Be Coming To an End*, 91 W. VA. L. REV. 817 (1989) (characterizing acid rain regulation in the United States as "totally ineffective").

165. *See* Convention on Long-Range Transboundary Air Pollution [hereinafter LRTAP], Nov. 13, 1979, 1302 U.N.T.S. 217; Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, Oct. 31, 1988, 28 I.L.M. 212 (1989); *see generally* Marc A. Levy, *European Acid Rain: The Power of Tote-Board Diplomacy*, *in* INSTITUTIONS FOR THE EARTH: SOURCES OF EFFECTIVE INTERNATIONAL ENVIRONMENTAL PROTECTION 75 (Peter M. Haas et al. eds., 1993) (discussing creation and goals of LRTAP); Gregory Wetstone & Armin Rosencranz, *Transboundary Air Pollution: The Search for an International Response*, 8 HARV. ENVTL. L. REV. 89 (1984) (discussing provisions of LRTAP).

166. *See* 42 U.S.C. §§ 7651–7651(*o*); Henry A. Waxman, *An Overview of the Clean Air Act Amendments of 1990*, 21 ENVTL. L. 1721, 1723–42 (1991).

167. *See* Johan G. Lammers, *The European Approach to Acid Rain*, *in* INTERNATIONAL LAW AND POLLUTION, *supra* note 7, at 267. The initial 30% reduction has recently been increased by additional amounts that vary with the identity of the state. *See* Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Further Reduction of Sulphur Emissions, annex II, June 14, 1994, 33 I.L.M. 1540 (1994).

emissions levels in the United States.[168]

The United States and its neighbors to the north and south have also entered into a small number of bilateral agreements concerning specific transboundary pollution problems.[169] Perhaps the clearest success story in terms of meaningful action by a source state involves pollution of the lower Colorado River.[170] An ill-conceived reclamation project in Arizona in the early 1960s caused the salinity of the Colorado drastically to increase, with devastating affects on crop yields in the Mexicali region of Mexico. After twelve years of negotiations, the United States agreed to take measures to restore salinity levels to roughly what they were before 1961.[171] Most North American transboundary pollution problems, however, have resisted any solution that would require the source state to take burdensome action beyond what it is prepared to take in order to abate domestic pollution.[172]

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168. *See* 42 U.S.C. § 7651(b) (1994).

169. Outside the U.S.-Canada and U.S.-Mexico contexts, such agreements are unusual but not entirely nonexistent. *See, e.g.*, Convention on the Protection of the Rhine Against Chemical Pollution, Dec. 3, 1976, 16 I.L.M. 242 (1977) (requiring that signatory countries adopt a permitting system for discharge of listed pollutants into the Rhine River); Convention on the Protection of the Rhine Against Pollution by Chlorides, Dec. 3, 1976, 16 I.L.M. 265 (1977) (requiring France to take specific measures to reduce discharge of chloride ions into Rhine, and apportioning expenses among France, Germany, Netherlands, and Switzerland).

170. *See generally* Joseph F. Friedkin, *The International Problem with Mexico over the Salinity of the Lower Colorado River, in* WATER AND THE AMERICAN WEST: ESSAYS IN HONOR OF RAPHAEL J. MOSES 31, 49 (David H. Getches ed., 1988) (recounting history); David H. Getches, *From Askhabad, to Wellton-Mohawk, to Los Angeles: The Drought in Water Policy*, 64 U. COLO. L. REV. 523, 531–34 (1993) (describing efforts to rectify damage done by earlier efforts to increase agricultural productivity in southwest Arizona).

171. The "permanent and definitive solution" to the problem was to be the construction of a high-tech desalinization plant built on the United States side of the border. Agreement on Colorado Salinity, Aug. 30, 1973, U.S.-Mex., 24 U.S.T. 1968, 1974–76. The plant took eighteen years to build, has experienced operational difficulties, and is regarded by United States budget overseers as entailing excessive costs. *See* Jenifer Warren, *Yuma Desalinization Plant Comes of Age—Too Late*, L.A. TIMES, Mar. 8, 1992, at A1. A diversionary drainage ditch has enabled the United States to remain in compliance with the substantive obligations of the agreement. If the ditch is not replaced by a functioning desalinization plant, however, politically unpopular steps will be necessary to curtail diversions of water in the upper Colorado. *See* Martin Van Der Werf, *Desalting Plant: White Elephant of Desert; $256 Million Facility Sits Idle Outside Yuma*, ARIZONA REPUBLIC, Nov. 14, 1993, at A8 (discussing problems with expensive Yuma plant, and difficulties meeting treaty water obligations to Mexico). Thus, a key aspect of the bilateral agreement—the United States commitment to a "permanent and definitive" solution to the salinity problem on the lower Colorado—has yet to be achieved.

172. Perhaps the clearest illustration of this resistance is provided by the Canadian-American agreement on acid rain reached in 1991. The agreement commits both nations

A number of interstate compacts in the United States also contain substantive restrictions on pollutants. The best documented is the Ohio River Valley Water Sanitation Commission, or ORSANCO, established in 1948.[173] This compact comprises eight states that border the Ohio River and its major tributaries, and provides, *inter alia*, for mandatory sewage treatment by all municipalities within the basin.[174] ORSANCO is also authorized to bring direct enforcement action against recalcitrant sources.[175] Although ORSANCO and other interstate water pollution compacts suggest that meaningful collective action by interstate compact is possible, in reality these agencies have played a relatively minor

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to caps on sulfur and nitrogen oxide emissions and creates a dispute resolution framework for tackling future controversies. *See* Agreement on Air Quality, March 13, 1991, U.S.-Can., 30 I.L.M. 676 (1991). The agreement, however, requires only that the United States carry out the reduction in emissions already mandated in the 1990 Clean Air Act Amendments. *See id.* at 685–690. Thus, Canada secured nothing in the agreement by way of additional limitations on emissions of precursor gases beyond what the United States had already agreed to as a matter of domestic politics.

Similarly, while Mexico and the United States have reached bilateral agreements about pollution reaching the United States from the Tijuana and New Rivers, *see* Nick Johnstone, *International Trade, Transfrontier Pollution, and Environmental Cooperation: A Case Study of the Mexican-American Border Region*, 35 NAT. RESOURCES J. 33, 43–44, 56–57 (1995); Margaret M. Sullivan, Comment, *Transboundary Pollution from Mexico: Is Judicial Relief Provided by International Principles of Tort Law?*, 10 HOUS. J. INT'L L. 105, 108–09 (1987), implementation of these agreements has proved to be difficult. In order to stem sewage overflows from the Tijuana, for example, the United States allows much of the wastewater collected in Tijuana to be conveyed to a treatment facility in San Diego. The United States, California, and San Diego have agreed to shoulder nearly 80% of the cost of constructing a new binational treatment plant on the United States side of the border. *See* Johnstone, *supra*, at 46–48.

173. *See* EDWARD J. CLEARY, THE ORSANCO STORY: WATER QUALITY MANAGEMENT IN THE OHIO VALLEY UNDER AN INTERSTATE COMPACT 3 (1967). Other interstate compacts that contain substantive limitations on interstate pollution include Delaware River Basin Compact, DEL. CODE ANN. tit. 7, §§ 6501, 6511 (1991) (setting up commission from Delaware, New Jersey, New York, and Pennsylvania to draw up plan to protect Delaware River Basin); New England Interstate Water Pollution Control Compact, CONN. GEN. STAT. ANN. § 22a-309 (West 1995) (setting up commission between Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont to protect streams, ponds, and lakes that flow in two or more states); Interstate Commission on the Potomac River Basin, MD. CODE ANN., ENVIR. § 5-303 (1996) (setting up commission with Maryland, West Virginia, Pennsylvania, Virginia, and D.C. to Protect the Potomac River Basin). *See generally* BRUCE A. ACKERMAN ET AL., THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY (1974) (analyzing the policymaking process involving the Delaware River Basin Commission).

174. *See* Ohio River Sanitation Compact, OHIO REV. CODE ANN. § 6113.01 (Banks-Baldwin 1995).

175. *See id.*

role in transboundary pollution control efforts. They have tiny budgets and seem to serve mostly to coordinate and generate support for state environmental enforcement actions.[176] With the advent of federal statutes directly regulating point sources of pollution in the 1970s, these agencies lost most of their original rationale, and many have ceased to function.

c. Agreements to cooperate. The vast majority of bilateral and multilateral treaties dealing with transboundary pollution fall well short of adopting either a liability regime or specific limitations on transboundary pollutants. Some create joint commissions or committees to address transboundary pollution problems. While the functions of these bodies vary, they are commonly instructed simply to gather and share information, and make recommendations for future bilateral or multilateral action.[177] Apart from these traditional investigatory and advisory roles, few commissions are given the authority to reach final decisions that attribute responsibility for transboundary pollution. Rather, any disputes that arise typically must be referred to the contracting parties or to the International Court of Justice.[178]

More commonly, bilateral and multilateral treaties simply commit the parties to various forms of cooperation.[179] Some require advance notification and consultation about potential transboundary pollution problems.[180] Others provide for exchanges of information or research findings.[181] Still others consist of vague

176. *See* CLEARY, *supra* note 173, at 214, 236–38. On the shortcomings of interstate water pollution control compacts more generally, see James W. Curlin, *Interstate Water Pollution Compact: Paper Tiger or Effective Regulatory Device?*, 2 ECOL. L.Q. 333 (1972); N. William Hines, *Nor Any Drop to Drink: Public Regulation of Water Quality Part II: Interstate Arrangements for Pollution Control*, 52 IOWA L. REV. 432 (1966).

177. *See, e.g.*, Agreement on the Action Plan for the Environmentally Sound Management of the Common Zambezi River System, May 28, 1987, art. 2(b) & Annex II, 2 SELECTED MULTILATERAL TREATIES IN THE FIELD OF THE ENVIRONMENT 389, 399–401 (Iwona Rummel-Bulska & Seth Osafo eds., 1991) [hereinafter SMT].

178. *See, e.g.*, Agreement on the Yugoslavian-Hungarian Water Economy Commission, Aug. 8, 1955, Yugo.-Hung., art. 9, 9 INTERNATIONAL PROTECTION OF THE ENVIRONMENT 4538, 4542 (Bernd Ruster & Bruno Simma eds., 1977).

179. *See, e.g.*, Agreement Concerning the Regime on the Soviet-Polish State Frontier, July 8, 1948, Pol-U.S.S.R., art. 17, 9 INTERNATIONAL PROTECTION OF THE ENVIRONMENT, *supra* note 178, at 4475, 4477.

180. *See, e.g.*, Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil, June 9, 1969, art. 5, 704 U.N.T.S. 3, 6.

181. *See, e.g.*, Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, June 21, 1985, 2 SMT,

provisions requiring simply that the parties employ "all appropriate measures" to prevent transboundary pollution.[182]

On balance, the record of collective action by agreement is not very impressive. The significance of the agreements that do exist should not be denigrated. Of greater importance, however, is the fact that the vast majority of boundary and cross-boundary rivers and transboundary airsheds are not subject to any transboundary pollution agreement; they are not even subject to an agreement to cooperate in developing information. The record reveals that meaningful bilateral or multilateral agreements can be reached, at least in some circumstances. But in most parts of the world, bilateral and multilateral agreements, like adjudications of liability, are essentially nonexistent.

II. STRUCTURAL BARRIERS TO EFFECTIVE REGULATION OF TRANSBOUNDARY POLLUTION

Transboundary pollution has long been perceived as presenting certain unique features relative to other international or multijurisdictional environmental problems. In this Part, I will consider what these structural features are, and how they may account for the general failure to achieve effective collective action to deal with transboundary pollution.

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supra note 177, at 324, 326.

182. *See, e.g.*, Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, Mar. 23, 1981, 20 I.L.M. 746, 748 (1981) (requiring the parties to employ such measures). Like their international counterparts, most interstate compacts also take the form of vague agreements to cooperate and employ best efforts to resolve transboundary disputes. These compacts frequently create commissions charged with setting water quality standards, drafting and recommending legislation on pollution, and gathering and sharing information. Such commissions may be granted the authority to hold hearings to determine whether corrective action on the part of individual polluters is needed. *See, e.g.*, Tennessee River Basin Water Pollution Control Compact, KY. REV. STAT. ANN. § 224.18–780 (Banks-Baldwin 1992). But typically these rulings must be reviewed and can only be enforced by state or federal courts. *See, e.g.*, Klamath River Basin Compact, CAL. WATER CODE § 5901 (West 1971). A number of compacts (including ORSANCO) create commissions that are given their own enforcement powers, but these commissions have such small budgets that these powers are rarely exercised. *See supra* text accompanying note 176.

Similarly, attempts to stimulate less formal coordination and cooperation in regional environmental planning have not been notably successful. *See* J.B. Ruhl, *Interstate Pollution Control and Resource Development Planning: Outmoded Approaches or Outmoded Politics?*, 28 NAT. RES. J. 293, 309–13 (1988).

A. *The Salient Features of Transboundary Pollution*

It will be useful to begin with a more precise definition of transboundary pollution and a discussion of the characteristics which distinguish it from other types of multijurisdictional environmental problems. As used in this article, "transboundary pollution" refers to a physical externality or spillover that crosses state lines. More precisely, transboundary pollution occurs when a potentially harmful environmental agent is released in one political jurisdiction (the source state) and physically migrates through a natural medium such as air, water, or soil to another political jurisdiction (the affected state).[183] Examples include sewage discharged into a river in one state that is transported downstream to another state, and radiation released from a nuclear power plant in one state that spreads over downwind states.

It is also useful, for analytical purposes, to note two other multijurisdictional environmental problems.[184] The first is multi-

183. This definition is similar to the definition of "transfrontier pollution" that was adopted by the Organization for Economic Cooperation and Development Council: "any intentional or unintentional pollution whose physical origin is subject to, and situated wholly or in part within the area under, the national jurisdiction of one Country and which has effects in the area under the national jurisdiction of another Country." Organization for Economic Cooperation and Development: Council Recommendation on Implementing a Regime of Equal Right of Access and Non-Discrimination in Relation to Transfrontier Pollution, Annex, July, 1977, 16 I.L.M. 977, 979 (1977).

184. In addition to those mentioned in the text, one could also distinguish another two phenomena: (1) damage to globally unique natural resources and (2) transboundary shipment of hazardous wastes. The former occurs when unique resources located in one state, such as an endangered species or a beautiful natural formation (such as the Grand Canyon) are harmed. This can be of great concern to persons living in other states, but the transjurisdictional effect is not a physical spillover but a psychological one—what economists might call transjurisdictional injury to options values or existence values. *See* Ohio v. United States Dep't of the Interior, 880 F.2d 432, 475–76 nn.72, 73 (D.C. Cir. 1989); *see generally* Esty, *supra* note 4, at 594–97 (noting that psychological externalities raise a "choice of public" issue). Because of these psychological spillovers, the destruction of globally unique natural resources is likely to affect persons all over the world, in contrast to the physical spillovers of transboundary pollution, where the effects are typically limited to two or a small number of states.

Transboundary shipment of hazardous wastes involves an environmentally harmful agent generated in political jurisdiction A that enters political jurisdiction B pursuant to a contract providing for the shipment or disposal of the wastes. Implicit in my definition of transboundary pollution is the understanding that, because the movement of potentially harmful enviroumental materials occurs in a natural medium like air or water, it takes place without the consent of the affected state. If the movement occurs pursuant to a contract, however, then the introduction of the potentially harmful environmental material occurs with the consent of the affected state—or at least with the consent of a person subject to the legal authority of the affected state. For this reason, transboundary ship-

jurisdictional *regulatory competition* which may result if states are free to set different environmental standards. The theory is that if state A sets low environmental standards, investors in state B will threaten to relocate to state A if standards are not similarly lowered in B.[185] Such pressure from investors seeking the lowest environmental compliance costs, it is hypothesized, can set off a "race to the bottom" in which many jurisdictions end up with lower environmental standards than they would adopt absent this pressure.[186] The concern with regulatory competition involves a pecuniary spillover—environmental standards in one state, through the intermediation of capital flows, are posited to have a spillover effect on environmental standards in another state. In structural terms, this perceived pecuniary spillover is distinguishable from the physical spillovers involved with transboundary pollution, however, because regulatory competition is likely to affect a large number

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ment of hazardous wastes also presents a different problem than transboundary pollution.

185. *See* Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1216 (1992).

186. Serious questions have been raised about whether the race to the bottom concern is valid. Some have questioned whether the theory underlying the concern is coherent. *See, e.g., id.* at 1233–44. *But cf.* Peter P. Swire, *The Race to Laxity and the Race to Undesirability: Explaining Failures in Competition Among Jurisdictions in Environmental Law*, 14 YALE L. & POL'Y REV. 67, 100–06 (1996) (arguing that Revesz overlooks the public choice dimension that makes individual states uniquely susceptible to capture by industry). Others have questioned whether the phenomenon, even assuming it exists, is sufficiently important to have a major impact on industrial location decisions. *See, e.g.*, Richard B. Stewart, *Environmental Regulation and International Competitiveness*, 102 YALE L.J. 2039, 2058–60, 2077–79 (1993). Still others have argued that the more important dynamic is a "race to the top." *See* DAVID VOGEL, TRADING UP: CONSUMER AND ENVIRONMENTAL REGULATION IN A GLOBAL ECONOMY 248–70 (1995). I do not address these questions here. Suffice it to say for present purposes that the *perception* of a possible race-to-the-bottom is widely shared by both environmentalists and local politicians, and that this translates into a demand for centralization of environmental controls. A recent prominent manifestation of this is the NAFTA side agreement on the environment. *See* North American Agreement on Environmental Cooperation Between the Government of the United States of America, the Government of Canada and the Government of the United Mexican States, Sept. 13, 1993, 1993 WL 645206 (Intl. Envtl. L.) (establishing a Commission for Environmental Cooperation to coordinate the environmental protection efforts of the three countries). NAFTA seeks to raise the level of enforcement of Mexican environmental laws in order to reassure persons in the United States that trade liberalization with Mexico will not result in the flight of capital as businesses seek the advantage of more lax environmental compliance standards in Mexico. *See* Nicolas Kublicki, *The Greening of Free Trade: NAFTA, Mexican Environmental Law, and Debt Exchanges for Mexican Environmental Infrastructure Development*, 19 COLUM. J. ENVTL. L. 59, 100–06 (1994).

of states, whereas the physical spillover ordinarily will affect only two or a small number of states.

The second, distinguishable phenomenon can be called *pollution of a commons.* This phenomenon occurs when a potentially damaging agent is released into physical space that is not subject to the control of any identified sovereign, and then physically migrates through a natural medium such as air or water to impose harm on persons in one or more political jurisdictions. Examples would include oil spilled from ships into a sea or ocean, which then washes ashore; gases emitted into air which destroy the ozone layer of the upper atmosphere, increasing surface levels of ultraviolet radiation around the world; and satellites launched into space that crash to earth. Here, because the potentially damaging agents do not immediately cross a border but rather are released into a commons, any state that abuts on or has access to the commons can be a source of the problem, and any state that abuts on or has access to the commons can be affected by the problem. The problem thus also typically implicates large numbers of states and consequently again has structural features that differ from the defining elements of transboundary pollution.[187]

Having distinguished transboundary pollution from these other multijurisdictional phenomena in terms of its structural features, it is also worth introducing two distinctions within the universe of transboundary pollution. The first is the contrast—or perhaps more accurately, the continuum—between total and partial transboundary pollution. Total transboundary pollution occurs when a state sets up a tall smokestack or outflow directly on the border with another state, such that the entire quantity of pollution is directed into the territory of the other state. Partial transboundary pollution, which is much more common, occurs when the source of pollution is located so as to discharge only a portion of the pollution into another state. Partial transboundary pollution can obviously range from one to ninety-nine percent. As the percentage falls, the portion of the problem internalized to the source state rises, as does the prospect that the source state will adopt a regulatory response based on the costs incurred by its own residents.

187. The distinction between the structural features of transboundary pollution problems and commons problems is persuasively developed in STONE, *supra* note 24, at 50–95.

The second distinction, also a continuum, is between unidirectional and reciprocal transboundary pollution.[188] The pure case of unidirectional transboundary pollution occurs when all transboundary pollution between two states moves in the same direction. State A always sends pollution in the direction of State B, never vice versa. The pure case of reciprocal transboundary pollution occurs when, as between State A and State B, 50% of the transboundary pollution flows one way, and 50% the other. Reciprocal pollution can occur over time, as where air pollution from Detroit affects air quality in Windsor, Canada, on some days, and air pollntion in Windsor affects air quality in Detroit on other days.[189] Or it can occur simultaneously, as where two cities in different countries share a single air shed and both discharge pollutants into the air and simultaneously suffer harm from the resulting air quality.[190]

There are probably relatively few cases of either pure unidirectional or pure reciprocal transboundary pollution. Usually there will be some pollution going both ways, but on net one state will be more of a source state and the other more of an affected state. One example of a reciprocal pollution problem that typically has unidirectional effects overall is acid rain. Because of persistent patterns of prevailing upper atmospheric winds, some states emit relatively large quantities of the gases that contribute to acid rain relative to the amount of acid precipitation they incur, while others incur large amounts of acid precipitation relative to the gases they emit.[191]

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188. *See* Esty, *supra* note 4, at 591 ("The direction of the flow of harms will also affect the likelihood of achieving effective interjurisdictional cooperative policies.").

189. *See* INTERNATIONAL JOINT COMMISSION, REPORT ON THE POLLUTION OF THE ATMOSPHERE IN THE DETROIT RIVER AREA 5 (1960) (reviewing Detroit-Windsor air pollution problems).

190. *See* Johnstone, *supra* note 172, at 39–40 (describing air pollution in the Ciudad Juarez-El Paso air shed).

191. *See* BRUNEE, *supra* note 164, at 8–34. Acid rain is caused by pollutants like sulphur oxides and nitrogen oxides from multiple sources, often located in multiple states. These pollutants enter the upper atmosphere where they mix together with other chemicals under the influence of sunlight, and return to earth often at a considerable distance from the original sources as precipitation with high acid content. Prevailing winds often mean that downwind states suffer disproportionately from acid rain relative to the amount of precursor gases they emit. *See* JAMES L. REGENS & ROBERT W. RYCROFT, THE ACID RAIN CONTROVERSY 41–47 (1988).

B. *A Model of Collective Action To Redress Multijurisdictional Environmental Problems*

In considering why the structural features of transboundary pollution generally frustrate collective solutions, it will be useful to have a model of the conditions that give rise to regimes of collective action in the multijurisdictional environmental context. To that end, I will adopt an economic framework derived from Harold Demsetz' pioneering work on the emergence of property rights.[192] Under this model, collective action regimes arise in order to reduce externalities of various types, be they physical, pecuniary, or psychological. However, any regime for collective action—a long-term contract, a firm, a market, a system of private property rights, or a government—entails certain costs. Demsetz referred to these as "transaction costs,"[193] a term that has certain narrow connotations which may be misleading in the present context.[194] We can think of these costs more broadly as simply "regime costs," that is, any dedication of scarce resources that may be required in order to create and maintain a structure for collective action. Following Demsetz, then, the general criterion for determining when any type of collective action regime will arise is that the benefits of the regime in terms of reducing externalities must exceed the costs of creating and sustaining the regime.[195]

As refined by other analysts, the cost-benefit criterion for predicting when collective action regimes will arise is not viewed as an all or nothing proposition. Rather, the cost-benefit criterion is seen as a condition underlying a progressive evolution of institutional forms. If the benefits in terms of reduced externalities are small, then the institutional response will be rudimentary (i.e., not

192. *See* Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967). Demsetz's model has been refined and extended to a variety of contexts, including the emergence of markets, *see* David E. Van Zandt, *The Market as a Property Institution: Rules for the Trading of Financial Assets*, 32 B.C. L. REV. 967, 975 (1991), and the evolution of different forms of environmental regulation, *see, e.g.*, Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 8–12 (describing four models of how to manage the global commons).

193. *See* Demsetz, *supra* note 192, at 348–49.

194. The term "transaction costs" is often taken to refer to the costs of negotiating and writing contracts. *See, e.g.*, Thomas W. Merrill, *Trespass, Nuisance, and the Costs of Determining Property Rights*, 14 J. LEGAL STUD. 13, 21–22 (1985). Collective action regimes, as discussed here, include much more than negotiated contracts and, therefore, greater costs.

195. *See* Demsetz, *supra* note 192, at 350.

very costly). As the benefits of overcoming these problems become progressively larger, the institutional response will become progressively more sophisticated (i.e., more costly).[196]

The magnitude of the benefits from creating a collective action regime will be a function of different variables in different contexts.[197] With respect to multijurisdictional environmental problems, two factors seem especially relevant in determining the magnitude of the benefits: 1) the seriousness of the external harm that would be alleviated by establishing and maintaining a regime of collective action; and 2) the frequency of that harm, that is, how many states or persons within states are affected and how often.

The seriousness of the external harm is a function of both objective and perceptual factors. For present purposes, we can simply take it as a given that some externalities, such as the threat of skin cancer from ozone depletion, are generally perceived as being very serious harms;[198] other external harms, such as haze in the air that impairs visibility, are perceived as being less serious. The significance of frequency of occurrence is self evident: the more widely a harm is experienced, both in terms of the numbers of states and persons within states affected and in terms of how often they are affected, the greater will be the perceived need to invest in a collective action regime to deal with that harm. The frequency of harm can range from pervasive and continuous, as in the case of exposure to ultraviolet radiation caused by depletion of the ozone layer, to highly localized and episodic, as in the case of oil spills.

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196. *See generally* Rose, *supra* note 192, at 8–24 (making this point in the context of explaining the evolution of environmental control regimes from those that do nothing, to zoning, to technology-based controls, to market mechanisms). Each environmental control regime discussed by Rose involves progressively higher regime costs, and will emerge only when the benefits, in terms of alleviating progressively greater pressures on scarce resources, increase. *See id.* at 24.

197. For example, in determining whether a private property system will emerge in a given resource, the scarcity of the resource and the level of demand for it may be critical. *See* Demsetz, *supra* note 192, at 350–59. In determining whether an organized market will emerge for a particular asset, important factors include the frequency of trading and the costs of obtaining information about the asset. *See* Van Zandt, *supra* note 192, at 977–86.

198. *See* RICHARD ELLIOT BENEDICK, OZONE DIPLOMACY: NEW DIRECTIONS IN SAFEGUARDING THE PLANET 20–22 (1991) (discussing the "harmful effects of ozone modification"); BRUNEE, *supra* note 164, at 79 (noting that if ozone depletion is stabilized at 2% by 2025, 114,000 new cases of skin cancer will be prevented).

On the cost side, there are also two factors that seem especially relevant: 1) whether the interests of individual states are in conflict or alignment with respect to the externality in question; and 2) the number of states that must be induced to cooperate if the collective action regime is to be effective.

The distinction between states with conflicting interests and states whose interests are in alignment can be described in terms of game theory. What I call a conflicting interest situation is one where, even if a strategy of mutual cooperation would increase the parties' joint welfare, one party will always be worse off cooperating than it will be if it refuses to cooperate. This can be described as a "cooperator's loss" game.[199] Noncooperation is always the preferred strategy for the player who will be worse off, unless some mechanism can be devised for transferring part of the collective gains to this player in order to induce him to switch to a cooperative strategy.

In contrast, what I call an aligned interest situation can be described in terms of the familiar prisoners' dilemma game.[200] Here again, a strategy of mutual cooperation will increase the parties' joint welfare, but now *all* parties will be better off if such a strategy can be realized. Viewing the situation as a rational-egoistic actor, each party has an incentive not to cooperate, but if some mechanism can be devised for inducing mutual cooperation, the situation is potentially a positive-sum game for all.

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199. *See generally* Adam L. Aronson, Note, *From "Cooperator's Loss" to Cooperative Gain: Negotiating Greenhouse Gas Abatement*, 102 YALE L.J. 2143, 2149–60 (1993). Aronson coins the term "cooperator's loss" to describe, in game-theory terms, the problem of global warming, where he assumes that both the United States and many less developed countries would incur losses by cooperating in the formation of a greenhouse gas regulation regime. The same analysis applies even more clearly to transboundary pollution. Regime theorists in international relations have described transboundary pollution as an example of a "Rambo game." *See* Martin List & Volker Rittberger, *Regime Theory and International Environmental Management*, *in* THE INTERNATIONAL POLITICS OF THE ENVIRONMENT 85, 98 (Andrew Hurrell & Benedict Kingsbury eds., 1992). This is because the affected states, like certain dominant military powers, always have the upper hand in the conflict and hence perceive themselves as losers under a regime of collective action to reduce conflict. *See id.* I prefer the term "cooperator's loss," because it suggests the solution to the non-cooperation problem: the creation of a mechanism for making side payments from the winning states to those states that lose by entering into a cooperative pollution regulation regime. *See* Aronson, *supra*, at 2156–58.

200. On the assumptions behind the prisoner's dilemma, see ERIC RASMUSEN, GAMES AND INFORMATION 17–19, 30–31 (2d ed. 1994).

The distinction between conflicting interest or cooperator's loss situations and aligned interest or prisoners' dilemma situations is an important variable in determining the costs of regime formation. In both situations, it will be necessary to expend resources in order to induce states to overcome rational-egoistic incentives not to enter into a regime and to police against cheating or defecting once a regime is formed. But in the cooperator's loss situation, it will also be necessary to devise a mechanism for making side payments to the states for whom cooperation is never a rational option. Thus, there must be a mechanism for taxing the winners and transferring the proceeds to the losers in order to induce them to enter the regime. Of course, the payment need not be in money; various *quid pro quos* are possible. But the costs of creating and maintaining this additional mechanism for side payments makes it inherently more costly to create a collective action regime in the conflicting interest situation than in the aligned interest situation.

The second cost-related variable concerns the number of states whose cooperation must be enlisted in order to make the regime work. This variable derives from the standard assumption of both transaction cost economics[201] and the interest group theory of politics[202] that, because of holdout and free-rider problems, the larger the number of parties involved, the more difficult it will be to reach agreement on the formation and maintenance of a regime for collective action. Thus, large numbers magnify the costs of collective action, whether it be the formation of a contract (as in transaction cost economics) or the enactment of new legislation (as in the interest group theory of politics).[203]

Notice that the number of affected states appears on both the benefit and the cost sides of the ledger. These factors cannot simply be netted out, however, because often the number or the iden-

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201. *See, e.g.*, A. Mitchell Polinsky, *Resolving Nuisance Disputes: The Simple Economics of Injunctive and Damage Remedies*, 32 STAN. L. REV. 1075, 1106–09 (1980) (discussing the relative desirability of damage and injunctive remedies when a polluter's conduct affects many victims who may "hold out" or "free ride" to maximize their own individual welfare).

202. *See, e.g.*, MANCUR OLSON, JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 58–60 (1965) (explaining that large groups may have difficulty organizing to achieve common goals, even if perfect consensus exists).

203. For the equivalence between transaction cost economics and the interest group theory of politics on this point, see NEIL K. KOMESAR, IMPERFECT ALTERNATIVES: CHOOSING INSTITUTIONS IN LAW, ECONOMICS, AND PUBLIC POLICY 105–22 (1994).

tity of the states benefited by a regime will be different than the number or identity of those whose cooperation is needed to effectuate collective action. To take one example, consider the risk of external harm in the form of injuries inflicted by falling satellites. Virtually every state is susceptible to this risk. Thus, because it is a large numbers problem on the benefit side, everything else being equal, the benefits of collective action should be relatively large. However, the only states whose cooperation is needed to establish a regulatory or liability regime to redress such harm are those with the technological capability of launching satellites—a much smaller number. Thus, on the cost side, the problem of falling satellites is a smaller numbers problem, suggesting that the costs of achieving effecting collective action should be, again relatively speaking, smaller than for some other problems.[204]

C. *Applying the Model to Transboundary Pollution*

Applying the foregoing model, it seems reasonable to conclude, at least as a general matter, that transboundary pollution is a poor candidate for the emergence of an effective regime of collective action relative to other types of multijurisdictional problems.

1. *Seriousness of Harm.* First, consider the seriousness of the harm. Obviously, one can cite individual examples of serious transboundary pollution, such as the salinization of the Colorado River, radiation from the Chernobyl reactor, and the Sandoz chemical spill. It is also clear that, to some extent, states have deliberately pursued strategies of substituting transboundary pollution for domestic pollution. For instance, both Great Britain and many states in the United States have sought to minimize local concentrations of air pollution by installing tall smoke stacks on sources, thereby disbursing the pollution over greater distances and often over other states.[205] Nevertheless, there are several reasons

204. Together, consideration of the two "numbers" variables in this example suggests that, putting aside other variables, effective collective action to deal with injuries from falling satellites should be easier to achieve than it will be in some other types of multijurisdictional euvironmental problems. And indeed, we find there is a relatively robust treaty imposing civil liability on launching states whose satellites cause damage. *See* Space Objects Convention, *supra* note 157.

205. *See* Peter Huber, *Electricity and the Environment: In Search of Regulatory Authority*, 100 HARV L. REV. 1002, 1034–35 (1987). This practice has since beeu prohibited.

to believe that, as a general matter, transboundary pollution does not present an especially serious form of harm relative to other types of multijurisdictional environmental phenomena.

The first concerns a physical property of pollution, at least pollution of the type involved in most transboundary pollution disputes. As a rule, the further a pollutant moves from its source, the less harm it does. In developing guidelines for models used to calculate the harm from air pollution, for example, the EPA has specified that, because "the air quality impact of many sources falls off rapidly to insignificant levels," no harm is presumed more than 50 kilometers downwind from a source.[206] Common water pollutants like sewage and most industrial wastes also break down as they travel through moving water over any distance.[207]

Most transboundary pollution is partial transboundary pollution, that is, it impacts the source's local environment before it reaches persons in the affected state. As a rough generalization, therefore, the harm to persons in affected states from transboundary pollution will be lower than the damages sustained by victims in the immediate vicinity of the source. The Chernobyl nuclear accident provides an illustration. After the accident, elevated levels of radiation were detected in at least eight downwind states.[208] But the immediate toll in terms of radiation sickness and deaths was almost entirely confined to the Soviet Union.[209]

See 42 U.S.C. § 7423 (1994) (prohibiting states from using tall stacks or other dispersion techniques to achieve compliance with air quality standards). *See* Revesz, *supra* note 4, at 2354–58.

206. National Emission Standards for Hazardous Air Pollutants, 43 Fed. Reg. 26,388, 26,398 (1978). *See Revesz*, *supra* note 4, at 2362–63. Of course, some transboundary pollution problems, most notably acid rain, are exceptions to the dissipation phenomenon. *See* ROY GOULD, GOING SOUR: SCIENCE AND POLITICS OF ACID RAIN 7 (1985) ("[sulfur dioxide] from . . . 'superstacks' can be carried hundreds or even thousands of miles downwind, remaining aloft long enough for a considerable fraction of the [sulfur dioxide] to be converted to acid before returning to earth.").

207. In determining whether water pollution sources violate effluent limitations, the EPA generally adopts a rule of thumb that the impact of the discharge should be measured at a distance of 100 meters from the point of discharge—the so-called "mixing zone." *See* Marathon Oil Co. v. United States EPA, 830 F.2d 1346, 1349 (5th Cir. 1987). Implicit in this rule is the judgment that the impact of a discharge on water quality dissipates very rapidly over fairly short distances.

208. *See* Melanie L. Oxhorn, *The Norms of Nuclear Accidents After Chernobyl*, 8 J. NAT. RESOURCES & ENVTL. L. 375, 377 n.9 (1993).

209. *See* Terry Hall, *". . . Carried By The Wind Out To Sea"* Ireland and the Isle of Man v. Sellafield: *Anatomy of a Transboundary Pollution Dispute*, 6 GEO. INT'L ENVTL. L. REV. 639, 650 (1994); Oxhorn, *supra* note 208, at 377. Some accounts predict that the

The fact that most transboundary pollution is partial rather than total leads to a second reason why the harm may be less serious. The greater the portion of the pollution that falls within the source state itself, the greater the incentive of the source state (acting at the behest of its own citizens) to adopt some kind of regulatory response. Given that part of the pollution costs are externalized to another state, the source state will never have perfect incentives to regulate. But to a degree, the persons within the source state affected by the pollution will act as "virtual representatives" of those in affected states.[210] Insofar as these source state victims convince the state to regulate the polluting activity, even if only in part, the degree of harm that will befall those in the affected state will also be diminished.

Finally, in recent years, central governments have been motivated by concerns other than the prevention of transboundary pollution to impose the adoption of pollution controls which have reduced the potential harm from transboundary pollution. This is especially true in the United States, where the national government has for the last twenty-five years required that all new major sources of pollution install expensive, technology-based control devices to meet air and water quality standards.[211] These requirements were not adopted out of concern for transboundary pollution, because they apply in equal measure to sources located well inland of any neighboring state where the pollution could not do any transboundary harm.[212] Nevertheless, because these requirements also cover new major sources located near borders, they undoubtedly reduce the total volume of transboundary pollution. Consequently, they have also reduced the benefits of adopting a

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long term effects of radiation exposure will result in premature deaths outside the former Soviet Union, but they will almost certainly be of a much lower magnitude than premature deaths in the immediate vicinity. *See id.* at 378 n.19.

210. *See* DAVID L. SHAPIRO, FEDERALISM: A DIALOGUE 84 (1995); STONE, *supra* note 24, at 50 ("Th[e] self-inflicted portion of the [transboundary] damage gives each polluting nation some incentive . . . to clean up its own act.").

211. *See, e.g.*, Clean Air Act, 42 U.S.C. § 7411 (1994) (standards for new stationary sources); Federal Water Pollution Control Act, 33 U.S.C. § 1316 (1994) (authorizing Administrator to establish standards of performance for new sources).

212. The structure of the major federal pollution control acts strongly suggests that the dominant motivation for federalizing environmental policy was concern about a race to the bottom. *See* Revesz, *supra* note 185, at 1224–27; *see also* Thomas W. Merrill, *Panel III: International Law, Global Environmentalism, and the Future of American Environmental Policy*, 21 ECOLOGY L.Q. 485, 490 (1994) (noting that the federal environmental laws create an "environmental floor," but not a ceiling).

special regime for addressing the problem of transboundary pollution.[213]

Whether other types of multijurisdictional pollution problems pose more serious harms will vary from problem to problem. The general consensus among observers, however, is that at least some paradigmatic examples of environmental commons problems, in particular the depletion of the ozone layer and global warming, present very serious threats to human health and welfare.[214] Not surprisingly, these problems have generated relatively elaborate collective responses.[215] The concern over regulatory competition also presents the prospect of serious harm, if it is true that regulatory competition sets in motion a process that generally undermines effective regulation of local pollution problems. A defective scheme for control of local pollution would presumably entail substantial costs to every jurisdiction.

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213. The NAFTA Side Agreement on the Environment, which calls for increased levels of environmental enforcement among the parties in order to reduce incentives for a race to the bottom, is another example of how a regime adopted for purposes other than control of transboundary pollution can have the potential to directly diminish the harm from transboundary pollution. *See* Charnovitz, *supra* note 2, at 313 (criticizing the Side Agreement as "rather shallow," but concluding that at a minimum, it offers "new possibilities for promoting cooperation, and for spotlighting national enforcement efforts on pollution and pesticide use."). Similarly, environmental regulations adopted at the Community level in the European Union, even if motivated by a desire to achieve harmonization of individual state standards, will still have the effect of reducing the need for transboundary pollution controls.

214. *See* George W. Rathjens, *Energy and Climate Change*, *in* PRESERVING THE GLOBAL ENVIRONMENT: THE CHALLENGE OF SHARED LEADERSHIP 154, 160–63 (Jessica Tuchman Mathews ed., 1991) (global warming); Richard Elliot Benedick, *Protecting the Ozone Layer: New Directions in Diplomacy*, *in* PRESERVING THE GLOBAL ENVIRONMENT, *supra* at 125–33 (ozone depletion).

215. The Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1550 (entered into force Jan. 1, 1989), is widely regarded as the most complete and effective regime of international environmental regulation ever adopted, and is cited as a model for use in attacking other international environmental problems. *See* Benedick, *supra* note 214, at 129–30. No binding regime dealing with global warming has yet emerged, but tremendous energy has been devoted in the diplomatic community and elsewhere devising a meaningful regime for tackling this problem. *See* United Nations Conference on Environment and Development: Framework Convention on Climate Change, May 9, 1992, at 1, U.N. Doc. A/AC.237/18 (Part II)/Add.1 (1992), *reprinted in* 31 I.L.M. 849 (1992); United Nations Conference on Environment and Development: Rio Declaration on Environment and Development, June 14, 1992, at 1, U.N. Doc. A/CONF.151/5 (1992), *reprinted in* 31 I.L.M. 874 (1992).

2. *Frequency of the Problem.* Next, consider the frequency of transboundary pollution. Other things being equal, the benefits of collective action to alleviate a problem that affects most states most of the time are likely to be greater than the benefits of collective action to address a problem that affects only some states some of the time. Given the observed physical properties of pollutants that cross state lines, transboundary pollution typically affects only two states or at most, a small number of states.[216] Transboundary pollution is also commonly episodic in nature, for example, it may result from an accident like the explosion of the nuclear reactor at Chernobyl or the Sandoz chemical spill.

Additionally, some geographically large states, like Russia, or geographically isolated states, like Great Britain or Australia, may have no experience or only limited experience with transboundary pollution. These states will have little incentive to participate in or contribute to a regime for regulating transboundary pollution.

In contrast, other types of multijurisdictional environmental problems are far more pervasive. Both environmental commons and regulatory competition involve problems that are, almost by definition, of concern to large numbers of states. A commons problem is one that harms resources shared in common by many or all states. Thus, a threat to an environmental commons is necessarily a problem for all the states that participate in the commons. The concern over regulatory competition is also a continuous and widespread problem, at least if one believes the story that competition will lead to a race to the bottom. The race to the bottom results in environmental standards in all jurisdictions being set at suboptimal levels, and thus is also necessarily a pervasive concern.[217]

3. *Conflicting Interests.* Turning to the cost side of the equation, transboundary pollution presents the classic illustration of a conflicting interests or cooperator's loss situation.[218] The basic

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216. *See supra* text accompanying notes 206–07.

217. Damage to globally unique natural resources also presents a pervasive problem, in the sense that persons all over the world will feel a sense of loss if species are extinguished or places of great beauty despoiled, *see supra* note 184.

218. *See* List & Rittberger, *supra* note 199, at 98–99. For a detailed analysis of the reciprocal incentives of the source state and the affected state to try to externalize costs to the other, *see* Revesz, *supra* note 4, at 2374–94.

problem is that the costs and benefits of the polluting activity and of regulation of that activity are symmetrically opposed between the source state and the affected state. If transboundary pollution is permitted to persist unregulated, then the source state internalizes (most of) the benefits of polluting activity and externalizes (some of) the costs to the affected state. If transboundary pollution is regulated, then the affected state internalizes (some of) the benefits of reduced pollution, and externalizes (all or nearly all of) the costs to the source state. The symmetrical opposition of the costs and benefits of regulation means that a noncooperative strategy always dominates for the source state: failure to agree upon a regime of regulation corresponds to a victory for the source state (benefits internalized, costs externalized) and a loss for the affected state. Concomitantly, agreeing upon a regime of regulation corresponds to a victory for the affected state (benefits internalized, costs externalized) and a loss for the source state.

Given this pattern of conflicting interests, any regime of collective action created to deal with the problem must provide off-setting compensation to the source state. Joint social welfare may be maximized by collective action, but the source state stands only to lose from participating in such a regime. Thus, it will refuse to cooperate unless some other benefit or advantage of greater value can be linked to its agreement to participate in a collective action regime.

Various mechanisms for providing such off-setting compensation are possible. Perhaps the most straightforward would entail identifying some type of reciprocal transboundary pollution. If a reciprocal problem exists, then one transboundary problem can be solved by pairing it with another problem running in the opposite direction; the two states can then adopt a regime which covers both problems. Another possible solution would be to pair nonpollution related benefits, such as trade concessions to the source state, with an agreement to abate transboundary pollution.[219]

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219. For an interesting proposal along these lines, see Barbara K. Bucholtz, *Coase and the Control of Transboundary Pollution: The Sale of Hydroelectricity under the United States-Canada Free Trade Agreement of 1988*, 18 B.C. ENVTL. AFF. L. REV. 279, 316 (1991). In this article, which was written shortly before the United States and Canada concluded their acid rain agreement, *see supra* note 172, the author suggested that the United States agree to reduce its emissions of gases contributing to acid rain in Canada in exchange for Canadian exports of below-market hydroelectric power to the United

Other, more creative compensation mechanisms may also be possible. Consider, for example, the acid rain provisions of the 1990 Clean Air Act amendments.[220] Acid rain in the United States is a complex transboundary pollution problem in which midwestern states centered around the Ohio Valley are seen as predominant source states, and states in the New England and Adirondack regions are seen primarily as affected states.[221] For nearly two decades, the midwestern states consistently blocked any meaningful federal regulation of acid rain, because they perceived that their citizens would end up paying higher utility bills while the benefits would largely inure to the citizens of New England and Adirondack states.[222] The impasse was finally broken by an agreement to create a system of tradeable emissions allowances to achieve these reductions.[223] The key feature of the system, in terms of overcoming the objections of the source states, was an agreement to give the bulk of the allowances in the initial round of the program to midwestern utilities.[224] Thus, the added costs of emissions reductions were offset in large part by the new wealth given to these utilities in the form of valuable allowances which could be traded to other sources for cash.

Other multijurisdictional environmental problems present more of an aligned interests or prisoners' dilemma situation. Both environmental commons problems and regulatory competition may entail situations of this nature.[225] That is, both may create circumstances in which each state will end up worse off if it pursues its own interests in isolation than if it can somehow agree to cooperate with other states in pursuit of a common goal. In either case, the possibility of reaching a cooperative solution transforms the situation into a potential positive-sum game. Collective action may be difficult to achieve in these situations because of free-rider problems, but if these problems can be overcome, there are potential gains for all involved.[226]

States. *See* Bucholtz, *supra*, at 312–16.

220. *See* 42 U.S.C. § 7651 (1994).

221. *See* REGENS & RYCROFT, *supra* note 191, at 42–47.

222. *See* WILCHER, *supra* note 164, at 66; Malley, *supra* note 162, at 838–39.

223. See 42 U.S.C. §§ 7651–7651*o*.

224. *See* Lisa Heinzerling, *Selling Pollution, Forcing Democracy*, 14 STAN. ENVTL. L.J. 300, 328–332 (1995).

225. On the problem of the commons as a prisoner's dilemma, see RUSSELL HARDIN, COLLECTIVE ACTION 16–37 (1982). On the race-to-the-bottom as a prisoner's dilemma, see Revesz, *supra* note 185, at 1217–19.

226. The problem of transboundary shipment of hazardous wastes is likely to present

4. *Small Numbers.* In one respect transboundary pollution problems should be more amenable to collective action than other types of multijurisdictional environmental problems. Transboundary pollution disputes typically involve a relatively small number of states (often ouly two).[227] In effect, given the principles of state responsibility and *parens patriae*, the states act as agents by consolidating the interests of many affected individuals on both sides of the border; they should therefore be able to reduce what would ordinarily be a large numbers nuisance dispute into a diadic or small numbers dispute.

Scholars writing in the tradition of transaction cost economics have sometimes assumed that virtually any small numbers dispute should be amenable to resolution through collective action in the form of a Coasean bargain.[228] Obviously, this is not what we observe with respect to transboundary pollution disputes. There are several reasons why small numbers alone do not guarantee Coasean bargains in this context.[229]

Perhaps the most important consideration, which is underscored by the model presented in this Article, is that the presumptive advantages that derive from small numbers of parties must be weighed against the other three factors, which as we have seen are generally not favorable to collective action against transboundary pollution. Thus, even if only a small number of parties are involved, the affected states will have to devise some mechanism for providing offsetting compensation to the source state. Direct payments of cash may be prohibited by law or may be unacceptable for political reasons.[230] And even if the offsetting compensation

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a less costly issue for effective collective action, because it involves a phenomenon in which the parties are already linked by a contract. The existence of the contract suggests that the interests of the states are not in sharp conflict—there are potential gains from trade to both sides. The contract also provides a ready mechanism for conditioning the introduction of the potentially harmful material in ways that protect the interests of the affected state, again in contrast to the situation with respect to transboundary pollution.

227. *See supra* text accompanying notes 206–07.

228. *See supra* note 18.

229. Two additional problems considered in Part III are the lack of clear legal entitlements and the absence of a central enforcement mechanism. *See infra* text accompanying notes 253–59.

230. In *Trail Smelter*, the tribunal reported that disputes over pollution in Washington State from smelters on the United States side of the border were handled by the companies purchasing smoke easements from farmers. The tribunal was informed, however, that under the law of Washington, foreign firms were prohibited from acquiring this kind of

problem can be solved, the total costs must be less than the benefits of establishing the regime; as we have seen, there is reason to believe that the benefits may be relatively low.

Sometimes, of course, transboundary pollution involves large numbers of parties. Acid rain is the primary example of a transboundary pollution problem that typically involves both numerous source states and numerous affected states. Here, of course, we encounter a major paradox. Although acid rain is the primary example of a transboundary pollution problem that does not involve small numbers, it is also the primary example of a transboundary pollution problem that has resulted in meaningful collective regulation. At the very least, this outcome again underscores the need to consider multiple factors in explaining the perceived pattern of regulation in this area of law.

D. *Explaining the Current Pattern of Transboundary Pollution Regulation*

The foregoing model can help explain a number of the features of the current state of transboundary pollution regulation. First, it can explain why there are very few multijurisdictional regimes that impose either liability or regulatory limits on transboundary pollution. The conditions are not favorable for the emergence of a general regime of regulation for transboundary pollution. Such a regime is especially unlikely given that most transboundary pollution problems are perceived as being relatively isolated and localized disputes. People tend to focus on *this* particular transboundary air pollution problem or *that* particular transboundary water pollution problem; the ones they focus on, of course, are the ones that have an immediate impact on them. As long as people perceive transboundary pollution this way, then any proposal to adopt a global or regional regime to deal with such problems will tend to be regarded as a small numbers problem with regard to benefits, but a large numbers problem with regard to costs. Only if people and nation-states come to view each individual transboundary dispute as just an example of a more generic phenomenon that affects nearly everyone (including themselves)

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property right. *See* Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1911, 1917–18 (1935). Thus, legal rules prohibited international Coasean bargains. Analogous problems would no doubt arise in having affected states make payments to source states in return for agreements to desist in polluting.

are we likely see significant support for a generalized regime of regulation of transboundary pollution; this is unlikely for the time being given popular perceptions about pollution disputes.

Second, the model can help explain why the "law in books" does not necessarily coincide with the "law in action." If the law in books prescribes an institutional response that entails costs that exceed the benefits derived from that response, then the law will be ignored.[231] Sometimes it will be ignored in favor of other methods of achieving collective ends, such as informal social controls.[232] Other times, as in the case of the United States environmental statutes dealing with transboundary pollution, the law in the books will never be translated into meaningful relief by those charged with administering it.

The reality is that a legal system does not act like a machine, automatically churning out the prescribed response to identified problems. Instead, it represents a kind of regulatory commons,[233] where effective action is dependent upon alliances of groups overcoming collective action barriers and pressuring administrators to respond. If structural factors act as an impediment to achieving effective regulation in the international arena, it is not unlikely that they will also frustrate effective collective action within a developed legal system. Congress can say that no state may interfere with the achievement of ambient air standards in another state, but getting the EPA to enforce this mandate is another matter.

Third, the model helps explain why transboundary pollution is more likely to be addressed through bilateral and multilateral agreements designed to address specific transboundary pollution problems than through global or regional regimes of liability or regulation. As we have seen, transboundary pollution typically

231. A famous example of this phenomenon involves the original hazardous air pollution provisions of the 1970 Clean Air Act which were so draconian they were virtually never enforced. *See* John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 ECOLOGY L.Q. 233, 250–82 (1990) (explaining that the EPA strategically delayed adoption of emission standards and effectively rewrote statutory provisions in its implementing regulations).

232. *See* ROBERT C. ELLICKSON, ORDER WITHOUT LAW 130–36 (1991).

233. *See* James E. Krier, *The Tragedy of the Commons, Part Two*, 15 HARV. J.L. & PUB. POL'Y 325, 338 (1992) (noting that a government does not coerce the public of its own accord, but rather the public must organize "to coerce the government to coerce it").

involves a small numbers dispute,[234] which is fertile soil for Coasean bargains. To be sure, the other factors that vex effective collective action against transboundary pollution also apply.[235] Still, to the extent that collective action is possible, one would expect to see it most often in the form of bilateral or limited multilateral agreements, because this exploits the one structural advantage of transboundary pollution disputes—the small numbers of parties typically involved. And indeed, as we have seen in Section I.B, the regimes that impose meaningful substantive limitations on such pollution are nearly all based on bilateral or limited multilateral agreements.[236]

Fourth, the model helps explain why, aside from acid rain, most of the examples of meaningful regulation of transboundary pollution that exist relate to the pollution of boundary waters.[237] Pollution of boundary waters involves elements of both partial and reciprocal transboundary pollution. Consider pollution entering the upper Rhine River along the border between Germany and France. From the German perspective, such pollution will be partial transboundary pollution, because it will not only affect other states bordering on the Rhine but also German cities and farms downstream from the point of discharge. In addition, the pollution has a strong reciprocal element: pollution emanating from the German side will effect French cities and towns, but at the same time pollution emanating from the French side will affect German cities and towns.

The partial pollution aspect of boundary water pollution means that, insofar as each country agrees to enter a regime of collective regulation, it will be agreeing in part to regulate for the benefit of its own citizens. Thus, there is a significant domestic political benefit from entering into such a regime. The reciprocal pollution element means that, to the extent that the collective regime regulates transboundary pollution affecting persons in other states, there will be a rough *quid pro quo* in the form of reductions in transboundary pollution coming from the other direction.

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234. *See supra* text accompanying notes 206–07.

235. *See supra* Section II.C.

236. *See supra* text accompanying notes 157–76.

237. Examples include multilateral agreements limiting certain kinds of pollution of the Rhine River, *see supra* note 169; the 1909 Boundary Waters Treaty between the United States and Canada, *see supra* note 84; and numerous bilateral European treaties, *see, e.g., supra* notes 177–81.

The pollution that Germany agrees to regulate that would otherwise affect France is matched, in an approximate way, by the pollution that France agrees to regulate that would otherwise affect Germany.[238]

Finally, the model can help explain the apparent anomaly that acid rain, the one transboundary pollution problem that most clearly involves large numbers of parties, has met with fairly elaborate collective institutional responses in both Europe and North America. First, although acid rain technically falls within the definition of transboundary pollution, in many respects it more closely resembles an environmental commons problem. Because acid rain is formed by complex chemical reactions in the upper atmosphere,[239] it has sources in many states and it affects many states, much the way ozone depletion or global warming operate. Thus, acid rain is a high frequency problem, both in the sense that it is a matter of concern to large numbers of states and in the sense that it is a relatively continuous problem. This translates into greater benefits from establishing a regime for collective action.

It is also significant that acid rain entails a considerable element of partial pollution. Here the partial element is not so much the fact that acid rain falls on source states as well as other states, but rather the fact that a source state that agrees to reduce emissions of the precursor gases of acid rain—principally sulfur dioxide and nitrogen oxides—also obtains benefits for its own citizens in the form of reduced levels of conventional ground level air pollutants. If power plants in Indiana cut their sulfur dioxide emissions by 50 percent in order to curb acid disposition in Adirondack lakes, this also has the effect of relieving the distress of asthmatics in Indiana. These localized benefits thus help sweeten the pill for source states of adopting tough acid rain regulations.

On the cost side, the commons-like features of acid rain mean that, at least for some states, acid rain bears the indicia of a

238. The fact that the pollution is reciprocal also helps temper extreme demands from any one state for complete abatement by the others. For example, it has been suggested that the United States acquiesced to something less than complete abatement of the pollution from the smelter in Trail, British Columbia, because the U.S. was worried about the impact of an absolute rule for pollution emanating from Detroit and Buffalo into Canada. *See* John E. Read, *The Trail Smelter Dispute*, 1 CAN. Y.B. INT'L L. 213, 224–25 (1963).

239. *See supra* note 191.

prisoners' dilemma game. To be sure, there are states that are primarily either source states or affected states. For these states, the problem is highly conflictual. But there are also a number of important states, like Sweden and Germany in Europe and Pennsylvania, New Jersey, and West Virginia in the United States,[240] that act both as source states and as affected states. For these states, acid rain presents more of a prisoners' dilemma type problem, in the sense that although they will experience costs from agreeing to a system of collective regulation, they will also enjoy substantial benefits. Collective regulation for these states is thus a potential positive-sum game; under the right circumstances they may form an alliance with the more purely affected states in support of regulation.

III. WHAT DOES LAW HAVE TO DO WITH IT?

The foregoing structural and institutional account of transboundary pollution disputes contains relatively little discussion of the law. Perhaps that is just as well, for one reading of this account is that effective regimes of collective action regulating transboundary pollution are not very likely to emerge, no matter what the law says. The basic insight of the structural and institutional account is that collective regulation of transboundary pollution will not occur unless the benefits to the involved parties exceed the costs, and the analysis set forth in Part II indicates that this criterion will not be satisfied very often. Thus, any discussion of the legal norms that should goveru transboundary pollution disputes may be just idle speculation: the quintessential example of an arid debate about legal doctrine having no appreciable payoff.

The foregoing account suggests a second, less obvious reason why we should arguably not spend much time considering the legal norms that govern transboundary pollution disputes. Effective regulation of transboundary pollution is probably more likely to come about indirectly, through the evolution of other institutions, rather than directly through the adoption of regimes dedicated to adjudicating transboundary pollution disputes. For example, the

240. *See* GREGORY S. WETSTONE & ARMIN ROSENCRANZ, ACID RAIN IN EUROPE AND NORTH AMERICA: NATIONAL RESPONSES TO AN INTERNATIONAL PROBLEM 52, 79 (1983) (Swedish and German positions); THE U.S. NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM, 1990 INTEGRATED ASSESSMENT REPORT 178–96 (1991) (comparing emissions of precursor gases and acidity of deposition in U.S. states).

creation of a more effective multijurisdictional regime to deal with the perceived problem of regulatory competition could result in a greater commitment to the enforcement of existing local pollution controls.[241] This commitment, in turn, would have the indirect effect of reducing transboundary pollution. Alternatively, using the law to encourage free trade and other types of interdependencies among states could result in more opportunities to provide offsetting benefits to source states in exchange for their agreement to establish transboundary pollution controls. The law that truly matters, it can be argued, is that which determines whether these other types of multijurisdictional regimes emerge; efforts at legal reform should therefore concentrate on these issues.

A. *Why Legal Norms Matter*

These dismissive reactions about the legal norms governing transboundary pollution are not without force. Nevertheless, I believe that the legal norms assumed to apply to transboundary pollution disputes do in fact matter, at least at the margins. Whether the benefits of collective action exceed the costs depends on the magnitude of those costs, and one variable that influences the size of those costs will be the legal rules presumed to apply in resolving transboundary pollution disputes. Thus, it is reasonable to assume that a set of cases exists in which meaningful collective action could be achieved under one legal rule, but not under another; the presumed existence of this set of cases justifies giving some consideration to the content of the legal rules.

Moreover, the balance of benefits and costs is fluid and constantly changing. Given continued population growth and economic development, it is not implausible that the benefits of achieving effective regulation of transboundary pollution may increase as time passes. The content of the legal rules presumed to apply to such disputes could function as a "tipping point" determining when failure and frustration turn to success. With better legal norms, the tipping point could come earlier than it would come with dysfunctional legal norms; once that point is reached, better norms could

241. A good example of this is the NAFTA side agreement on the environment, which creates a mechanism designed to encourage more effective enforcement of domestic environmental regulations by the signatory states (the target of concern being Mexico). *See* Charnovitz, *supra* note 2, at 260–61.

mean that regimes for controlling transboundary pollution would spread more quickly.

Finally, the law can do little if anything to change many of the structural and institutional factors that frustrate collective action against transboundary pollution. The content of the legal norms, however, is one variable that is clearly subject to human modification through debate and discussion—especially when the precedents and hard sources of law defining those norms remain thin and undeveloped. Human energies are best channeled in directions where they can have some influence, and with respect to transboundary pollution this may include consideration of the applicable legal norms. Thus, while at first it may appear that legal commentators have devoted a disproportionate amount of attention to identifying the correct legal norms governing transboundary pollution,[242] their energies may not be entirely misplaced.

The skeptic might reply that legal norms will have little or no significance without some kind of central authority with the power to enforce the norms. There are several responses to such an argument. First, with respect to much transboundary pollution, such a central authority already exists. Transboundary pollution within federal systems like the United States, Canada, and Australia is susceptible to adjudication by national tribunals. In the United States, as we have seen,[243] the Supreme Court formerly adjudicated such disputes, and the EPA has the authority to do so today under the Clean Air Act and the Clean Water Act. Although surprisingly little effective regulation has emerged in the U.S. context, this may be due in part to the application of inappropriate legal norms. Similarly, a quasi-federal structure is emerging in Europe in the form of the European Union. One can easily imagine how an institution like the European Court of Justice could be given the task of adjudicating transboundary pollution disputes by issuing decrees having direct effect within the member states of the European Union.[244]

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242. An example would be the extensive debate over the meaning of the *Trail Smelter* arbitration and whether international law incorporates a rule of strict liability. *See, e.g., supra* notes 102–06.

243. *See supra* Section I.A.1.

244. *See* J.H.H. Weiler, *The Transformation of Europe*, 100 YALE L.J. 2403, 2413–22 (1991) (explaining the doctrine of "direct effect" and its interplay with other doctrines in the European Union).

Second, even where states are not already subject to the coercive authority of a central system of courts, they can always agree to subject their disputes to authoritative resolution by such an institution. Thus, one option in any transboundary pollution dispute is to submit the matter to the International Court of Justice or to an international arbitration panel. Presumably, the nature of the legal norms that the parties assume will be applied in resolving the dispute in an agreed-upon adjudicative setting will be an important variable in determining the frequency with which states elect this option.

Third, even when the parties forego litigation or arbitration of their disputes, the legal norms that are assumed to apply will provide an important negotiating point in bilateral or multilateral discussions about other types of collective solutions.[245] It always counts for something in a negotiation to be able to say that one's position is consistent with the law, or that the opposing side's position is not. Moreover, establishing that one's position conforms to the law may influence the attitudes of bystander states, as well as of the media and public opinion. These forces may bring pressure to bear on the parties in a way that influences the outcome.[246] Thus, even in a situation where litigation or adjudication is not a realistic option, the content of the legal norms carries rhetorical and moral force in deliberations about the problem.

Fourth, if the parties successfully negotiate a bilateral or multilateral solution to the problem, the legal norms that have been developed (if only in the writings of publicists) will tend to operate as a baseline against which specific negotiated solutions are developed.[247] Thus, if the legal norms are sound in the sense of

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245. *See* Bodansky, *supra* note 133, at 116–19 ("[I]nternational environmental norms can play a significant role by setting the terms of the debate, providing evaluative standards, serving as a basis to criticize other states' actions, and establishing a framework of principles within which negotiations may take place to develop more specific norms, usually in treaties.").

246. A dramatic illustration of this influence is the determination that a state has violated human rights provisions recognized by international law. *See, e.g.*, Convention for the Protection of Human Rights and Fundamental Freedoms, Nov. 4, 1950, 213 U.N.T.S. 221 (obligating participating European nations to respect the basic human rights of their citizens).

247. For example, in the Law of the Sea Treaty negotiations, the parties assumed that the existing 12 miles of territorial sea, which had been established as a matter of customary law, was the norm. This required states arguing for an expansion of the territorial sea (for instance, Chile) to give up bargaining points in exchange for partial recognition of its position. *See generally* Anthony D'Amato, *The Law-Generating Mechanisms of the*

providing a constructive and realistic solution to the problem, negotiated solutions are more likely to be sound. This outcome in turn will enhance the chances that the parties will actually adhere to rather than ignore the negotiated solutions and it will increase the prospect that other states will join in, or emulate, the negotiated regime.

B. *What's Wrong with Strict Liability*

1. *The Litigate-or-Settle Analogy.* What can we say more specifically about the influence of legal norms in resolving transboundary pollution disputes? One way to consider how legal norms might be important in this context is to reconsider the matter from the perspective of achieving Coasean bargains. As we have seen, bilateral and limited multilateral agreements are the most promising avenue for achieving meaningful collective action regulating transboundary pollution.[248] How might the legal norms that are assumed to apply to transboundary pollution disputes affect the frequency and the effectiveness of such agreements?

Commentators have advanced a number of theories to explain why background legal rules might effect the parties' ability to reach Coasean bargains in a small numbers dispute. These factors have usually been considered in the context of explaining why parties decide to proceed to trial rather than to settle litigation.[249] Most lawsuits involve only a small number of parties, and all lawsuits involve deadweight losses to the parties in the form of attorneys fees and costs; hence in each case there are potential gains to be divided among the parties if a settlement can be reached. Although most suits settle before trial, some do not.[250]

Law of the Sea Conferences and Convention, in CONSENSUS AND CONFRONTATION: THE UNITED STATES AND THE LAW OF THE SEA CONVENTION 125, 131–35 (Jon M. Van Dyke ed., 1984) (describing how vote trading was influenced by customary international law rule).

248. *See supra* text accompanying notes 164–76.

249. For an overview, see Robert D. Cooter & Daniel L. Rubinfeld, *Economic Analysis of Legal Disputes and Their Resolution*, 27 J. ECON. LITERATURE 1067, 1075–82 (1989) (discussing factors to be considered in deciding whether to settle a dispute or go to trial).

250. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 554 & n.1 (4th ed. 1992) (citing studies finding that only 2% of automobile accident claims go to trial, and less than 10% of medical malpractice claims are litigated); Marc Galanter & Mia Cahill, *"Most Cases Settle": Judicial Promotion and Regulation of Settlements*, 46 STAN. L. REV. 1339, 1340 (1994) (reporting that two-thirds of all civil cases settle "without a definitive

Commentators have considered various ways in which the nature of the background legal rules applicable to the suit might influence the rate of failures to reach mutually advantageous Coasean bargains in this small numbers setting.

One theory is that the failure to reach Coasean bargains is caused by uncertainly about the outcome if the case goes to trial.[251] The argument is that each party will have a limit on the price it will accept or pay for a settlement; this price will in part be a function of the party's prediction of the outcome. If the parties' predictions are the same or if one party is more pessimistic about a favorable outcome than the other, then a settlement will be reached, because the parties can do better by settling and dividing the savings in litigation expenses. But if each party is optimistic about a favorable outcome, they will litigate.[252] This view suggests that the law can increase the incidence of Coasean bargains by making the law more predictable, thereby reducing the number of cases in which both parties are more optimistic than their opponents about their chances of prevailing at trial.[253]

A second theory is that cases fail to settle because of strategic behavior by the parties.[254] In maneuvering over the division of the gains from trade, parties will sometimes take "hard" bargaining positions in the hope of getting the lion's share for themselves. Often this works: one party takes a hard position and the other responds with a soft position in order to preserve the possibility of settlement. Other times both parties take soft positions, in which case a deal is quickly reached. Occasionally, however, both parties stake out hard positions, and this results in a bargaining breakdown.[255] Generally speaking, this theory implies that "it is desirable for the law to eliminate the worst threats which the parties can make against each other."[256] In other words, legal rules

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judicial ruling").

251. *See id.* at 554–60; Keith N. Hylton, *Asymmetric Information and the Selection of Disputes for Litigation*, 22 J. LEGAL STUD. 187, 187 (1993); William M. Landes, *An Economic Analysis of the Courts*, 14 J.L. & ECON. . 61, 67–68 (1971).

252. *See* Landes, *supra* note 251, at 67–68.

253. The usual way of doing this would be to increase the number of precedents in any given area of the law. *See* William M. Landes & Richard A. Posner, *Legal Precedent: A Theoretical and Empirical Analysis*, 19 J.L. & ECON. 249, 271 (1976).

254. *See* ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 484–87 (1988).

255. *See id* at 487–91.

256. Robert Cooter et al., *Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior*, 11 J. LEGAL STUD. 225, 247 (1982).

should be designed to minimize the credibility of hard positions advanced in bargaining.

A third theory, which can be seen as a variation on either the first or the second, is that bargaining can fail even in low transaction cost settings because the parties possess private information about their preferences which they either conceal or deliberately distort in negotiations with the other party.[257] The unique contribution of focusing on private information is that some legal rules have the effect of forcing the parties to disclose all or part of this private information, which in turn will make it more likely that Coasean bargains can be reached. For example, one rule often followed in the dissolution of two-person partnerships requires the dissolving partner to name a price and then allows the other partner either to sell to, or to buy out, the dissolving partner at that price.[258] Such a rule obviously constrains the dissolving partner to select a price that accurately reflects the dissolving partner's assessment of the true worth of the enterprise; deviating in either direction creates an opportunity for the other partner to secure a windfall.[259]

Synthesizing these academic contributions, it would seem that the legal system can best facilitate Coasean bargains in small numbers settings by adopting rules that: 1) make it relatively easy for the parties to predict the outcome if no agreement is reached; 2) offer minimal opportunities for either party credibly to take extreme or threatening positions toward the other party; and 3) force parties to disclose information about their true valuations of the possible outcomes to the dispute. Presumably, no legal rule will perfectly embody all three of these attributes; there will have to be some trade offs.[260] The relevant question is comparative: how does the current consensus view about the appropriate legal norm governing transboundary pollution—a universal norm of strict liability for any pollution that causes significant harm in the affect-

257. *See* Ian Ayres & Eric Talley, *Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade*, 104 YALE L.J. 1027 (1995).

258. *See id.* at 1072.

259. This rule bears an obvious resemblance to the cake cutting game, in which one child cuts the cake and the other gets to chose which piece to eat. *See* WILLIAM POUNDSTONE, PRISONER'S DILEMMA 43, 52–53 (1992).

260. To take a familiar conundrum, predictability will generally be advanced by bright line rules, but bright lines rules create opportunities for strategic behavior.

ed state—fare under these criteria, and is it possible to identify another norm that would satisfy these criteria better?

2. *Why Strict Liability Exacerbates Bargaining Breakdown.* Whatever one might say in support of strict liability,[261] it does not stack up well when measured against these criteria. First, the rule of strict liability, at least in its current formulation, does not lead to predictable results. On its face, the strict liability rule would seem to provide a predictable standard of conduct, at least once the significant injury threshold is crossed. But the problem is that the parties do not know which version of "the law" to turn to in assessing their rights and obligations: the official version in the books or the version that applies in practice. The official version suggests a predictable rule that is highly protective of affected states; the version that applies in practice also suggests a predictable rule, but one that favors source states.[262] This gulf between official norms and actual practice complicates the process of reaching negotiated solutions because it makes it very difficult to assess how any particular transboundary pollution problem would be resolved if it were actually adjudicated either in a court of law or in the court of public opinion.

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261. It might be argued that Coasean bargains are frustrated by the failure to be sufficiently strict about strict liability. In other words, if the legal regime in fact rigorously enforced a rule of liability against source states causing non de minimus pollution in affected states, this would establish a clear baseline of entitlements, which would in turn lead to more frequent bilateral agreements. But this argument overlooks the difference between imposing clear entitlement rules (and injunction remedies) in thick markets with low transactions costs, and imposing such a rule (and remedy) in a thin market with only two or a very limited number of parties. *See, e.g.*, Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61 (1986) (providing a rationale for eminent domain based on bargaining breakdown in "bilateral monopoly" situations). As Robert Cooter and others have argued, imposing clear assignments of entitlements and injunction remedies in two-party markets often leads to strategic bargaining and the frustration of Coasean trades. *See supra* notes 249–59 and accompanying text.

Another and very different argument might be that a rule of strict liability sends a clear message about the importance of protecting environmental values, and thus may help shape public preferences in the direction of greater environmental protection. *See* Richard B. Stewart, *Regulation in a Liberal State: The Role of Non-Commodity Values*, 92 YALE L.J. 1537, 1578–79 (1983); Cass R. Sunstein, *Endogenous Preferences, Environmental Law*, 22 J. LEGAL STUD. 217, 229–30 (1993). I believe that there is merit to this argument, but its force is considerably weakened if the regime of strict liability never gets off the ground, so that the norm comes to be perceived as merely aspirational rather than "real."

262. *See, e.g., supra* text accompanying notes 142–51 (discussing futility of efforts to obtain relief under the Clean Air Act).

Second, the strict liability norm seems designed to maximize, not minimize, the opportunities for the parties to take "hard" positions in strategic bargaining. Under the norm, each side can argue that legal resolution of the dispute would result in complete vindication of its position, and a complete vanquishment of the other's. The ability to make these arguments is likely to be threatening to each side. As Christopher Stone has observed: "A nation whose pollution has been challenged but which is denied, under the strict liability doctrine, an opportunity to defend on the grounds that its actions were reasonable or that the damage was unforeseeable, will be that much less likely to consent to be sued."[263] The affected state, on the other hand, will be concerned that by "going to the law" it will end up with nothing, most likely because the source state will refuse to assent to any adjudication of the problem at all. The ability of each party to make credible threats to wipe out the other side's legitimate interests under the norm of strict liability thus increases the potential for strategic moves that lead to bargaining breakdown.

Third, the existing rule does little to compel the parties to disclose private information. The affected state might be content with a regime of partial regulation, but the strict liability regime provides no occasion for this to be brought out. To the contrary, the rule creates an incentive for the affected state to exaggerate its injuries, in order to meet the significant harm threshold that triggers strict liability. Alternatively, the source state might be willing to adopt certain control measures, but the structure of the strict liability norm militates against any concession that regulation of any type is warranted. Such a concession would imply that the source state bears some causal responsibility for the harm, and the rule creates an incentive for the source state to deny all causal connection.

If strict liability does a poor job of encouraging the formation of meaningful collective action regimes, is there an alternative conception of the legal norms that might do better? To consider one such possibility, I propose to return to the ultimate source of today's customary international law of transboundary pollution: the original jurisdiction decisions of the U.S. Supreme Court on the subject rendered in the first three decades of this century. As we

263. STONE, *supra* note 24, at 62.

have seen,[264] these decisions have been interpreted as adopting a norm of strict liability for transboundary pollution clearly causing significant injury. I will suggest, however, that these decisions may be read another way—a way that leads to a different and potentially more promising conception of the applicable legal norms.

IV. THE SUPREME COURT AND THE GOLDEN RULES

The conventional reading of the Supreme Court's original decisions on transboundary pollution is the one adopted by the *Trail Smelter* arbitration panel.[265] The panel interpreted these decisions as establishing a legal norm that looks much like one vision of the common law of nuisance:[266] all transboundary pollution is subject to a single universal standard, which requires a threshold finding that the source state has clearly caused "significant" harm in the affected state. Once that threshold is crossed, the source state is strictly liable, and the presumptive remedy is automatic injunctive relief.

A careful re-reading of these cases, however, suggests that they do not articulate a universal rule applicable to all transboundary disputes. Rather, they regard each dispute as the occasion to identify a unique "equitable" solution to the relevant problem, i.e., one that is sensitive to the respective needs and interests of both states. The spirit of these decisions is not that of a search for the one "true" rule, but rather a concern with maintaining peace among neighbors.

Unfortunately, the Supreme Court's decisions do not provide much guidance about the underlying principles to be used in identifying solutions to transboundary pollution disputes that are equitable in this sense. The last three decisions from the 1920s and

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264. *See supra* Section I.A.

265. *See supra* text accompanying notes 96–101.

266. One could describe this as a late-nineteenth century vision. The notion that nuisance law entails a balancing of the gravity of the harm to the plaintiff versus the social utility of the defendants' conduct is relatively modern, and dates from the RESTATEMENT (FIRST) OF TORTS §§ 822, 826 (1939). An older and rival tradition regarded a nuisance as an intentional interference with property rights, and avoided a balancing test approach. *See* MORTON J. HOROWITZ, THE TRANSFORMATION OF AMERICAN LAW 1870–1960, at 28 (1992); Robert G. Bone, *Normative Theory and Legal Doctrine in American Nuisance Law: 1850 to 1920*, 59 S. CAL. L. REV. 1101, 1159–60, 1160 n.126 (1986). For a modern reformulation of a rule-like vision of nuisance law, see Richard A. Esptein, *Nuisance Law: Corrective Justice and Its Utilitarian Constraints*, 8 J. LEGAL STUD. 49 (1979).

early 1930s, in particular, are rather sorry examples of "equity" decisionmaking in the form of ad hoc intuitionism. But some of the decisions, especially *Missouri v. Illinois*,[267] contain the seeds of a potentially promising strategy for identifying situation-specific equitable solutions based on norms that are immanent in the parties' own conduct in regulating their internal affairs. The Court articulated this alternative strategy in terms of a traditional maxim of equity: one who seeks equity must do equity.[268] I will speak of this strategy in terms of two inter-state golden rules:[269] the "reverse golden rule"—do not ask of other states what you do not ask of your own citizens—and the "golden rule"—do unto other states as you do to your own citizens.

A. *Missouri v. Illinois*

As recounted earlier, Justice Holmes' opinion in *Missouri v. Illinois*[270] addresses three issues: the source of law to be applied, the "principles" of that law, and the application of those principles to the sharply disputed facts presented by Chicago's engineering feat in reversing the flow of the Chicago River. However, international law sources like the *Trail Smelter* decision have paid relatively little attention to what Holmes actually said in the one paragraph where he attempted to define the principles that should guide resolution of the case. It is set forth here in full:

> As to the principle to be laid down the caution necessary is manifest. It is a question of the first magnitude whether the destiny of the great rivers is to be the sewers of the cities along their banks or to be protected against everything which threatens their purity. To decide the whole matter at one blow by an irrevocable fiat would be at least premature. If we are to judge by what the plaintiff itself permits, the discharge of sewage into the Mississippi by cities and towns is to be expected. We believe that

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267. 200 U.S. 496 (1906).

268. Missouri v. Illinois, 200 U.S. at 523, 525–26.

269. The classic formulation of the "golden rule" is from Jesus' Sermon on the Mount: "[W]hatever you wish that men would do to you, do so to them." *Matthew* 7:12. Similar prescriptions are found in the teachings of a variety of world religions. *See* George P. Smith, II, *Nuisance Law: The Morphogenesis of an Historical Revisionist Theory of Contemporary Economic Jurisprudence*, 74 NEB. L. REV. 658, 673–74 (1995) (noting that cousins to the "golden rule" not only occur in Judaism and Stoicism but also in historically Asian religions like Buddhism and Hinduism).

270. 200 U.S. 496; *see also supra* text accompanying notes 31–50.

> the practice of discharging into the river is general along its banks, except where the levees of Louisiana have led to a different course. The argument for the plaintiff asserts it to be proper within certain limits. These are facts to be considered. Even in cases between individuals some consideration is given to the practical course of events. In the black country of England parties would not be expected to stand upon extreme rights. Where, as here, the plaintiff has sovereign powers and deliberately permits discharges similar to those of which it complains, it not only offers a standard to which the defendant has the right to appeal, but, as some of those discharges are above the intake of St. Louis, it warrants the defendant in demanding the strictest proof that the plaintiff's own conduct does not produce the result, or at least so conduce to it that courts should not be curious to apportion the blame.[271]

The *Trail Smelter* panel and ensuing commentators have essentially focused only on the last sentence, and only on the thought that the affected state's own practices "warrant[] the defendant in demanding the strictest proof that the plaintiff's own conduct does not produce the result."[272] This statement of course supports the conventional view of the holding of *Missouri v. Illinois*—that the plaintiff state must prove by clear and convincing evidence that it has suffered actual injury.[273]

But reading *Missouri v. Illinois* as a case announcing a general standard for proof of causation elides the balance of the discussion in the paragraph, and in particular discounts the fact that it alludes twice to the equitable doctrine of clean hands—that one who seeks equity must do equity. The first time the doctrine is mentioned, Holmes remarks that it is a "fact[] to be considered."[274] Toward the end of the paragraph the idea is stated in even more unequivocal terms: "Where, as here, the plaintiff has sovereign powers and deliberately permits discharges similar to those of which it complains, it . . . offers a standard to which the defendant has the right to appeal."[275] Of all the statements thrown off in this key paragraph, this remark is the one that perhaps comes the closest

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271. 200 U.S. at 521–22 (citations omitted).
272. *Id.* at 522.
273. *See, e.g.*, New York v. New Jersey, 256 U.S. 296, 309 (1921); Trail Smelter (U.S. v. Can.), 3 R.I.A.A. 1905, 1965 (1949).
274. 200 U.S. at 522.
275. *Id.*

to sounding like a "principle to be applied," that is, a rule of decision.

Moreover, the opinion keeps reverting to the clean hands doctrine in its review of the evidence. In discussing Missouri's epidemiological evidence, for example, Holmes notes that "[t]he plaintiff obviously must be cautious upon this point, for if this suit should succeed many others would follow, and it not improbably would find itself a defendant to a bill by one or more of the States lower down upon the Mississippi."[276] In the concluding summary of the evidence, Holmes returned to the *in pari delicto* theme once again:

> The evidence is very strong that it is necessary for St. Louis to take preventive measures, by filtration or otherwise, against the dangers of the plaintiff's own creation or from other sources than Illinois. What will protect against one will protect against another. The presence of causes of infection from the plaintiff's action makes the case weaker in principle as well as harder to prove than one in which all came from a single source.[277]

This last remark may perhaps provide the clearest indication of how Holmes viewed the relevance of Missouri's own derelictions. It was relevant both to the standard for determining liability *and* to proof of liability. It not only made it "harder to prove" that the Illinois discharges had created a danger to the population of Missouri above and beyond that created by Missouri's own discharges, it also made "the case weaker in principle."[278]

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276. *Id.* at 523.

277. *Id.* at 525-26.

278. *Id.* at 526. A possible objection to reading *Missouri v. Illinois* as resting on an application of the clean hands doctrine is that Missouri was in fact asserting that Illinois had done something very different than what Missouri itself was doing. Everyone was dumping raw sewage into rivers. *Id.* at 521-22. But only Illinois had engaged in a massive public works project to reverse the natural flow of a river and send sewage in the opposite direction from where it would travel without human intervention. Missouri was asking the Court to enjoin another state's interference with the natural flow of the river in order to divert sewage to a neighboring state, something which Missouri itself had never done.

Significantly, however, Holmes anticipated and answered this objection. He noted in the penultimate paragraph of the opinion that the dredging of the canal and reversal of the river flow had been sanctioned by two acts of Congress, "the validity of which is not disputed." *Id.* at 526. This put the reversal of the flow beyond challenge, because, as Holmes had explained in an earlier part of the opinion, a public nuisance is an offense against the laws of the sovereign, and in an original suit in the Supreme Court, the sovereign is the federal government. *See id.* at 518 (discussing Pennsylvania v. Wheeling

In short, although the *Missouri v. Illinois* opinion can be read as establishing a high standard for proof of actual injury, it can also be read as resting ou the equitable doctrine of clean hands. Read in this fashion, the decision in effect endorses the reverse golden rule: in a transboundary pollution case, the affected state cannot demand tliat tlie source state adhere to a higher standard than the affected state applies to its own citizens.

B. Georgia v. Tennessee Copper Co.

Georgia v. Tennessee Copper Co.[279] came hard on the heels of *Missouri v. Illinois* and seems oddly inconsistent with the earlier decision. One discontinuity is tlie absence of any direct reference to the clean hands or *in pari delicto* reasoning that so dominates *Missouri v. Illinois.*[280] The sliort explanation for tlie absence of any sucli discussion is that tlie clean hands defense was not raised by the defendant copper smelters.[281] The smelters raised three

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& Belmont Bridge Co., 54 U.S. (13 How.) 518 (1851)). Accordingly, the only act of which Missouri could complain was the discharge of sewage into the rivers draining into the Mississippi, and Missouri itself was guilty of the same conduct. *See id.* at 522. As Holmes put it: "Of course these acts [of Congress] do not grant the right to discharge sewage, but the case stands no differently in point of law from a suit because of the discharge from Peoria into the Illinois, or from any other or all the other cities on the banks of that stream." *Id.* at 526.

279. 206 U.S. 230 (1907).

280. *See supra* text accompanying notes 51–66.

281. There are several reasons why the copper smelters did not raise the unclean hands defense. One was simply a matter of timing. The initial complaint and the record in *Georgia v. Tennessee Copper Co.* were compiled in 1905, *see supra* note 56; *Missouri v. Illinois* did not come down until 1906. When *Georgia v. Tennessee Copper Co.* was again set for hearing by the Supreme Court in 1907, the parties stipulated that it should be decided on the original, that is, pre-*Missouri v. Illinois*, record. *Id.* Thus, there was no opportunity to develop evidence responsive to the "principles" of *Missouri v. Illinois.*

A second reason was that the copper smelters had achieved a qualified measure of success in earlier litigation in state court, when the Tennessee Supreme Court ruled that although the sulphur fumes were a nuisance, the proper remedy was damages rather than injunctive relief. *See* Madison v. Ducktown Sulphur, Copper & Iron Co., 83 S.W. 658, 666–67 (Tenn. 1904). Perhaps influenced by this degree of success, the defendants concentrated on the same argument in the Supreme Court. *See Tennessee Copper*, 200 U.S. at 235.

A third reason is that there is no suggestion in the record that Georgia was itself discharging or permitting the discharge of any sulphur fumes in the northwest corner of the state which were commingled with the fumes discharged by the copper smelters in Tennessee. *See id.* at 234–39. Thus, the case did not present a direct parallel to *Missouri v. Illinois.* In order to make the clean hands or *in pari delicto* argument, counsel would have had to have the imagination to investigate Georgia's regulatory behavior in other

principal defenses: 1) the action was not a true public nuisance suit but rather a collection of private nuisance suits that Georgia was improperly seeking to assert in a representative capacity; 2) Georgia's suit was barred by laches; and 3) the Supreme Court, like the Tennessee Supreme Court, should balance the equities and limit Georgia to a damages remedy.[282] The Supreme Court, in perfectly conventional fashion, considered and rejected each of these defenses.[283] Having resolved the issues presented by the parties, the Court entered judgment accordingly.[284] Although the clean hands defense of *Missouri v. Illinois* was not placed at issue in *Tennessee Copper*, Holmes penned a short paragraph announcing that the Court was satisfied that the "requirements" of the earlier case had been met.[285] This paragraph sheds little light on the Court's understanding of those requirements.[286]

The paragraph does, however, contain the following cryptic statement: "Whether Georgia by insisting upon this claim is doing

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parts of the state, and then invoke this as evidence relevant to the appropriate decisional rule to apply to the controversy in the northwest corner. This was too far of a leap, especially given the lack of time to assimilate the message of *Missouri v. Illinois*.

282. *See* Brief and Argument of the Defendant Tennessee Copper Company on Final Hearing, at 88–119, *Tennessee Copper*, 206 U.S. 230 (filed Feb. 25, 1907), [hereinafter Tennessee Copper Brief]; Brief and Argument of the Defendant Ducktown Sulphur, Copper and Iron Company, Limited, on the Final Hearing, at 50–81, *Tennessee Copper*, 206 U.S. 230 (filed Feb., 21, 1907). It was also argued that the record in the case failed to establish that the complaining parties in Georgia had suffered sufficient injury to warrant equitable relief. *See* Tennessee Copper Brief, at 102–07.

283. *See Tennessee Copper*, 206 U.S. at 237–39.

284. *See id.* at 239.

285. *See id.* at 238–39.

286. Nevertheless, there is language in this paragraph that casts doubt on the orthodox reading of those principles as requiring "clear and convincing" proof of causation. In discussing the standard of liability in the latter case, the Court said it was satisfied "by a preponderance of evidence" that the fumes "cause and threaten damage on so considerable a scale" so as to make out a case "within the requirements of *Missouri v. Illinois*." *Id.* at 238–39. Moreover, in the next paragraph of the opinion, rejecting a defense of laches, Holmes observes that "the plaintiff now finds, *or thinks that it finds*, that the tall chimneys in present use cause the poisonous gases to be carried to greater distances than ever before and that the evil has not been helped." *Id.* at 239. The opinion concludes that "*[i]f the State of Georgia adheres to its determination*, there is no alternative to issuing an injunction." *Id.* Together, the impression one gets from these comments is that insofar as the issue of causation was concerned, the Court viewed the requirements of *Missouri v. Illinois* as more of a pleading rule than a demand for proof of injury, clear and convincing or otherwise. As long as fumes could be seen and smelled in Georgia, and Georgia asserted that its rights were being infringed upon by this intrusion from out of state, Georgia had satisfied whatever causation requirement was germane in a transboundary context.

more harm than good to her own citizens is for her to determine."[287] Conceivably, this could be an allusion to the possibility that some Georgia citizens were employed by, or otherwise had econonnic interests in, the Tennessee works and would be harmed if they shut down.[288] But it is also possible that the comment was intended to express the same thought conveyed in *Missouri v. Illinois*, where Holmes had observed that if Missouri's "suit should succeed many others would follow, and it not improbably would find itself a defendant to a bill by one or more of the States lower down upon the Mississippi."[289] The idea that interstate disputes should be resolved in accordance with norms of reciprocal application was in fact a theme that Holmes adverted to several times in his long judicial career.[290]

In other words, it is possible to read *Georgia v. Tennessee Copper Co.* as signalling the Court's continued desire to resolve transbonndary pollution disputes in terms of norms of reciprocity.[291] On this reading, Georgia, by insisting on certain conduct from out-of-state sources, was implicitly appealing to a standard that it too would be required to live by. Georgia prevailed in the case because the defendants presented no evidence to show that Georgia was itself violating the standard to which it appealed.

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287. *Id.*

288. Support for this reading is snpplied by the fact that Georgia cited the economic injury to its own citizens as a reason for seeking postponement of injunctive relief after it prevailed and was given the right to enjoin the nuisance. *See* Motion for Leave to Postpone Entry of Final Decree, at 2–3, *Tennessee Copper*, 206 U.S. 230 (filed Oct. 21, 1907).

289. Missouri v. Illinois, 200 U.S. 496, 523 (1906).

290. *See* Bean v. Morris, 221 U.S. 485, 487 (1911) ("We believe that it always was assumed . . . that the States were willing to ignore boundaries and [allow] the same rights to be acquired from outside the State that could be acquired from within."); Rickey Land & Cattle Co. v. Miller & Lux., 218 U.S. 258, 260–67 (1910) (in a water rights dispute spanning two states, either court may exert jurisdiction, taking into account and accommodating the law of the other state); Mannville Co. v. City of Worcester, 138 Mass. 89, 90–91 (1884) ("[I]f the substantive end to be obtained is a proper one, it will be recognized and acted on here, as we have no doubt that it would be in Rhode Island if the position of the parties were reversed."). Not surprisingly, the idea is also featured in the Court's water apportionment decisions, most prominently *Kansas v. Colorado*, 206 U.S. 46 (1907). In that case, the Court stated: "As Kansas thus recognizes the right of appropriating the waters of a stream for the purposes of irrigation, subject to the condition of an equitable division between the riparian proprieters, *she cannot complain if the same rule is administered between herself and a sister State.*" *Id.* at 104–05 (emphasis added).

291. *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE AND POLICY 99 (2d ed. 1996).

Nevertheless, the state was warned that it would be expected to abide by that standard in the future.

C. New York *and* New Jersey

The last three original decisions—one suit filed by the State of New York against New Jersey and two by New Jersey against the City and State of New York, respectively[292]—add little to our understanding of the skeletal statements about the applicable legal principles contained in *Missouri v. Illinois* and *Georgia v. Tennessee Copper Co.* One of the cases, involving the proposed construction of a sewage outflow from the Passaic River in New Jersey into New York Bay,[293] gives further credence to the orthodox interpretation of *Missouri v. Illinois*; but it also supports this Article's revisionist interpretation. The Court announced for the first time (in so many words) that the plaintiff state must prove by "clear and convincing" evidence that the defendant state's conduct poses a threat of incremental harm beyond that resulting from background levels of pollution.[294] But the opinion also stressed that New York was just as guilty or more guilty of the conduct by New Jersey of which it was complaining.[295] The Court suggested that this conduct provided an independent reason for denying New York's request for equitable relief.[296] Thus, *New York v. New Jersey* can be read as carrying forward the reverse golden rule theme introduced in *Missouri v. Illinois.*

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292. *See* New Jersey v. City of New York, 283 U.S. 473 (1931); New Jersey v. New York, 283 U.S. 336 (1931); New York v. New Jersey, 256 U.S. 296 (1921).

293. *See* New York v. New Jersey, 256 U.S. at 300.

294. *See id.* at 309.

295. The Court took note of New Jersey's allegation, in its answer, that the City of New York discharged seven times the amount of sewage into New York Bay as was projected to flow from the Passaic sewer line, and that New York's sewage, up to that time, was entirely untreated. *See id.* at 303. The Court relied on this in rejecting New York's claim that the project would threaten damage to vessel hulls and create a risk of airborne diseases. *See id.* at 309–10. New York also maintained that the proposed treatment method would lead to offensive odors and "oily and sleek fields" on the surface. *Id.* at 310. The Court found the expert testimony on this point conflicting, and also found it "of much significance" that New York City had recently embarked upon a project of treating its sewage in a manner "very similar to, but not so extensive and thorough as," that proposed by New Jersey. *Id.* at 311.

296. *See id.* at 309–11 ("[W]hen it is considered that . . . all of the sewage from . . . New York City . . . has been discharged into the harbor, quite untreated, the evidence does not justify the conclusion that . . . such waters can sustain much further damage from the addition to them of the sewage of the Passaic Valley . . . .").

More importantly, none of the three cases approaches the problem as one requiring the articulation of a universal legal norm. In keeping with the admonition of *Missouri v. Illinois* that "the destiny of the great rivers" should not be decided "at one blow by an irrevocable fiat,"[297] each of the three opinions is very fact-intensive, and resolutely avoids generalizations. By the 1930s, the Court was using special masters to take evidence about these disputes. Like a court reviewing an arbitration, these later decisions proceed by reviewing and deferring to the particular findings and recommendations of the special master.[298] The cases also advance the theme of reciprocity, and the need to find a solution that is satisfactory to both states in the sense that it will bring about peace between neighbors. As it had in the first two transboundary pollution disputes, the Court continually reverted to the idea that "[d]ifferent considerations come in when we are dealing with independent sovereigns having to regard the welfare of the whole population and when the alternative to settlement is war."[299]

In terms of jurisprudential development, the New York-New Jersey cases are undoubtedly *too* fact-intensive. Much like the interstate water apportionment decisions of the same era,[300] they seek an equitable solution to each particular dispute, but do so in a way that provides virtually no guidance to either the Court itself or other parties in future controversies. Even if the Court was not prepared to establish a fixed rule to govern transboundary pollution disputes, the Court would have better served posterity by

297. Missouri v. Illinois, 200 U.S. 496, 521 (1906).

298. *See* New Jersey v. New York, 283 U.S. at 343–46 (1931); New Jersey v. City of New York, 283 U.S. at 477–83 (1931).

299. New Jersey v. New York, 283 U.S. at 342. *See also* North Dakota v. Minnesota, 263 U.S. 365, 372–73 (1923) (noting that the Constitution confers jurisdiction over interstate disputes to the Supreme Court "as a substitute for the diplomatic settlement of controversies between sovereigns and a possible resort to force").

300. *See* Nebraska v. Wyoming, 325 U.S. 589, 618 (1945) (noting that "[p]riority of appropriation is the guiding principle," but that the court must engage in a "delicate adjustment of interests" to ensure that its apportionment is equitable); Connecticut v. Massachusetts, 282 U.S. 660, 670–71 (1931) (declining to resolve dispute by applying common law of riparian rights, and instead considering "the pertinent laws . . . and all other relevant facts . . . [to] determine what is an equitable apportionment . . . of such waters"); Wyoming v. Colorado, 259 U.S. 419, 495–96 (1922) (dividing available water on the basis of prior appropriation); Kansas v. Colorado, 206 U.S. 46, 117 (1907) (dismissing the complaint of the State of Kansas because defendant's water diversions resulted in an "equitable division of benefits").

making an effort to elaborate on the "principles" of *Missouri v. Illinois*, if only to identify the kinds of factors that are relevant in resolving individual disputes.

The important point here, however, is that the very absence of any reference to universal norms speaks volumes about the Court's understanding of the basic approach established in *Missouri v. Illinois* and *Georgia v. Tennessee Copper Co.* In contrast to the *Trail Smelter* panel, for example, the Supreme Court did not view its own decisions as laying down any general rule governing all transboundary pollution disputes. Whatever the "principles" of *Missouri v. Illinois* and *Tennessee Copper*, they were understood by the Court to be fully consistent with an approach grounded in principles of equity, reciprocity, and neighborly accommodation.

D. *The OECD Principles and the Golden Rule*

Although two of the Supreme Court's five original decisions expressly invoke the clean hands doctrine—what I have called the reverse golden rule—none alludes to the possibility of applying the golden rule. For this idea, we must fast forward to the 1970s, and the minority tradition in soft international law which calls for adoption of a norm of reciprocity in resolving transboundary pollution disputes. In particular, the OECD Principles Concerning Transfrontier Pollution, released in 1974, urge that such disputes be approached through what they call a principle of "nondiscrimination":[301] source states should apply the same pollution control standards to persons residing in other states as they apply to their own citizens,[302] and should afford the same procedural rights to persons residing in other states as they afford to their own citizens.[303]

Like the reverse golden rule of *Missouri v. Illinois*, the golden rule of the OECD Principles would resolve transboundary pollution controversies by adopting a norm that one of the parties to the dispute has demonstrated it is prepared to impose on itself. In *Missouri v. Illinois*, that norm came from the conduct of the plaintiff—the affected state. Under the OECD Principles, the norm derives from the conduct of the defendant—the source state.[304]

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301. OECD Recommendation, *supra* note 118, at 242.
302. *See id.*
303. *See id.* at 245.
304. *See id.*

Both the reverse golden rule and the golden rule share the same general strategy, however, insofar as they seek to identify a norm of inter-state behavior that is immanent in the behavior of one of the parties to the dispute, rather than to discover and impose a universal rule for all cases. And both the reverse golden rule and the golden rule are animated by a desire to avoid strategic or exploitative behavior by one state toward another—whether it be the affected state trying to foist expensive control requirements on its neighbors that it is not prepared to shoulder itself; or the source state trying to dump pollution on its neighbors that it would not tolerate in its own backyard. It remains to be seen whether the two golden rules can be synthesized into a general approach to transboundary pollution disputes, and if so whether this approach might be a more promising legal norm than the current consensus favoring a universal norm of strict liability.[305]

V. THE CASE FOR THE GOLDEN RULES

The great virtue of the golden rules is that they allow us to identify norms for resolving transboundary pollution disputes reflected in the conduct of the parties to each dispute. There is no need to identify a "one size fits all" rule that must govern both a dispute between Switzerland and France over pollution of Lake Geneva and a dispute between Bangladesh and India over pollution of the River Ganges. The golden rules do this by exploiting a feature of transboundary pollution not shared by private nuisance

305. Another possible source of analogical support for the reverse golden rule and the golden rule might be the Supreme Court's decisions applying the dormant Commerce Clause doctrine to strike down state rules that discriminate against out-of-state waste. *See* C&A Carbone, Inc. v. Town of Clarkstown, 511 U.S. 383 (1994); Oregon Waste Sys., Inc. v. Dep't of Envtl. Quality, 511 U.S. 93 (1994); Fort Gratiot Sanitary Landfill, Inc. v. Michigan Dept. of Nat. Resources, 504 U.S. 353 (1992); Chemical Waste Management, Inc. v. Hunt, 504 U.S. 334 (1992); City of Philadelphia v. New Jersey, 437 U.S. 617 (1978). To be sure, because imported waste is already the subject of a commercial contract, it is easier to regulate than air and water pollution that crosses state lines. *See supra* note 184. But if we view imported waste as being akin to incoming air and water pollution, then the Court's decisions can be seen as adopting a kind of reverse golden rule. The affected state obviously permits the generation and disposal of positive quantities of waste within its own borders, but it is insisting of a higher standard (no importation of waste) from its neighbors. Alternatively, we can view state approved and licensed waste disposal facilities as a type of environmental control measure. On this view, the affected state may be seen as violating the golden rule, because it makes such facilities available to its own citizens, but not to the citizens of neighboring states. (I am indebted to David Dana for this point).

disputes. Private nuisance disputes share many of the same structural features as transboundary pollution disputes; they are, for example, highly conflictual. But in transboundary disputes the disputants are not only parties; they are also regulators with respect to analogous disputes that arise within their own territory. The golden rules draw upon the parties' behavior as regulators with respect to their own citizens in order to identify the appropriate norms for resolving their disputes with their neighbors.

A. *How the Golden Rules Might Operate*

Synthesizing the two golden rules into a single norm would not seem to present a conceptual difficulty. Both parties would be free to invoke either rule. The affected state, assumed to be the plaintiff, could invoke either the source state's norms of internal governance (under the golden rule) or its own internal norms of governance (under the reverse golden rule) as a standard for holding the source state responsible for transboundary pollution. Likewise, the source state, assumed to be the defendant, could cite either the affected state's internal norms (under the reverse golden rule) or its own internal norms (under the golden rule) as a defense against being held responsible.

I will not attempt to deduce a complete code of conduct for implementing the golden rules concept. Indeed, any such effort would be contrary to the spirit of the rules, which is to allow norms to emerge from the evolving internal practices of the parties with respect to different pollution problems. Nevertheless, a few observations about how one might resolve the more prominent questions arising under this approach are probably in order.

The first and most obvious question is what to do if there are conflicting golden rules—as well might happen if both the golden rule and the reverse golden rule can be invoked by either party. The answer would seem to be that we would proceed as we do in a typical appellate argument where the parties rely on conflicting authorities. The tribunal—or more likely in the international context, the parties in bilateral negotiations—would attempt to determine which of the two authorities is most closely on point. A variety of contextual factors would be relevant in making this determination: the nature of the pollutant in question; the amount of pollution and the pathways of exposure; the costs and benefits of controls in different circumstances, and so forth.

The process would presumably unfold in a dialogic fashion, much like an appellate argument: the plaintiff state would cite a particular internal practice of one of the contending states as a "precedent" for liability; the source state would point out features distinguishing this practice from the present controversy, and perhaps would cite an alternative internal practice which it would argue is a "precedent" more closely on point; the plaintiff state would then attempt to rehabilitate the original internal practice that it relied upon and distinguish the source state's alternative practice. The tribunal, if there is one, would have to determine which internal practice provides the more persuasive analogy to the dispute at hand, and presumably would cite reasons in support of its choice. If there is no tribunal, the parties would seek to persuade each other as to which internal practice provides the better benchmark.

A second question is whether the internal norms that can be invoked by the parties are the official norms of a state or the norms as they are actually enforced. In principle, it would seem clear that the relevant standard should be the actual practice of a state.[306] This standard represents the true judgment of one of the parties as to how the balance should be struck between the benefits and costs of regulation. Official norms may be disregarded or may be treated as largely aspirational;[307] it would be inconsistent with the logic of the golden rules to impose such a norm on another state if that norm is not actually followed.

One drawback of looking to actual practice rather than official norms, of course, is that this opens the door to a much more intensive—and expensive—factual investigation. As in private litigation, however, the amount the parties are willing to spend on factual investigations will be a function of how much is at stake. If there is not much at stake, the parties might be content to cite the official norms. Questions will also arise about what to do if one

306. By focusing on state practice rather than declarative law, the golden rules would represent a reversion to the older conception of customary international law as norms reflected in the conventional practices of states. *See* Bodansky, *supra* note 133, at 108–12.

307. For example, in the debates leading up to the Mexico-United States side agreements on the environment agreed to as a condition for the ratification of NAFTA, Mexican environmental law was characterized as being substantively similar to United States environmental law; the difference between the two nations was said to be that Mexican environmental law is generally not enforced to the same degree as American law. *But see* Charnovitz, *supra* note 2, at 280 (suggesting that this characterization is overly simplistic).

party bars another from obtaining discovery about the record of actual enforcement in another state. A possible solution to this problem would be to adopt presumptions that work against a state that denies discovery or otherwise frustrates an investigation into its enforcement practices by another state.[308] In effect, a state that denies discovery would be deemed either to enforce or not to enforce a norm—whichever construction was against its interest in the dispute.

A third question relates to the range of issues covered by the golden rules. Clearly the rules would be used to establish the standard of care. Arid debates about strict liability versus fault would be replaced with an examination of whether the release of a particular quantity of a particular pollutant in particular circumstances triggers a regulatory response under the internal norms of one of the states. The same follows for questions about the standard for establishing causation and the quantum of harm that must be shown. These questions would be resolved not in terms of abstract formulas but by an examination of the actual domestic practices of the parties. And there is no reason in principle why the golden rules could not also govern the question of relief. If a state limits private nuisance plaintiffs to damages rather than injunctive relief under certain circumstances, then the golden rules would limit the transboundary plaintiff to damages rather than injunctive relief. Finally, as the OECD Principles suggest,[309] the golden rules can even be extended to questions of procedure, such as the type of hearing rights that complaining parties are entitled to receive.

Of course, the golden rules can do no more than establish the content of the legal norms that apply to a given dispute. They do not obviate the need to prove that the source state in fact can be shown (with the requisite clarity) to have caused harm (of the requisite severity) in the affected state, and that one of the involved states would under similar circumstances in its domestic law provide relief (of the designated type). Disagreements about the facts, however, exist under any system of liability or negotiation.

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308. Thus, under the Federal Rules of Civil Procedure, one sanction available for failing to permit discovery is an order establishing that the matter as to which discovery was sought "shall be taken to be established for the purposes of the action in accordance with the claim of the party obtaining the order." FED. R. CIV. P. 37(b)(2)(A); *see also* FED. R. CIV. P. 36(a) (establishing that failure to respond or object to request for admission within designated time means the matter is admitted).

309. *See supra* notes 302–04 and accompanying text.

B. *Comparing the Golden Rules to Strict Liability*

We have already seen how the current official norm governing transboundary pollution disputes—strict liability for causing significant harm in another state—may work to frustrate negotiated solutions to transboundary pollution disputes. As it operates in practice, this norm renders the outcome of disputes unpredictable, creates opportunities for the parties to take extreme and threatening positions toward each other, and encourages parties to conceal rather than disclose private information about their true preferences.[310] There is reason to believe that the golden rules would do better on all scores.

Consider first the predictability of the rules. The strict liability regime is unpredictable largely because its abstract formulation is very different from its actual implementation. Of course, the content of the rule could be made more predictable if there were a large volume of adjudicated transboundary pollution controversies in which the strict liability rule was actually applied to specific factual circumstances.[311] But there are virtually no adjudicated transboundary pollution controversies, so the status of the rule remains ambiguous. Moreover, the uncertain content of the rule, in combination with the structural impediments to collective action, works to frustrate the emergence of an active tradition of adjudications that would allow us to break out of the circle.

The golden rules replace the abstract strict liability formula with what is in effect a question of fact: what is the actual practice of the involved states when a similar problem arises as a matter of internal governance? Naturally, there will be disagreements about which interual practice represents the best analogy to the transboundary conflict, and about the actual content of the internal practice. But now the applicable law is determined by real world institutional referents, subject to investigation (by both sides), and subject to the proffer and counter proffer of argument and evidence. If the two sides disagree sharply about what the applicable legal norms are, there is an alternative to the black box of going to trial: they can gather more evidence. Even if they do not reach an agreement, it is reasonable to assume that the process of adopting norms from existing practices will generate a narrower

310. *See supra* Part III.

311. *See* Landes & Posner, *supra* note 253, at 271.

range of disagreement than the process of attempting to predict the application of abstractions.

We also saw how the strict liability norm creates opportunities for the parties to take hard bargaining positions that can frustrate negotiated solutions.[312] Strict liability exacerbates the inherently conflictual nature of transboundary pollution disputes: it is threatening to the source state, because it suggests the possibility that the source state will be forced to take very expensive abatement measures or incur large financial obligations for the benefit of persons living in another jurisdiction. But strict liability is also threatening to the affected state, because the rule defined by actual practice appears to be that there is no effective sanction against transboundary pollution at all.

The golden rules would work to defuse the conflictual nature of transboundary pollution disputes, rather than exacerbate them. It is essentially a norm of reciprocity. The plaintiff state is not asking for special treatment, only that the defendant state respect a judgment that either the plaintiff or the defendant itself has already made and enforced on itself. The golden rules also minimize the range of possible outcomes, and thus reduce the possibilities for taking hard bargaining positions. It is unlikely that either state will have undertaken control measures that entail costs wildly out of proportion with benefits, or that the defendant state might regard as oppressive and unreasonable. Conversely, if the plaintiff state has genuine grievances, it is unlikely that both states will have completely ignored similar problems when they have arisen internally.

Finally, we have seen that the rule of strict liability encourages parties to conceal private information for strategic advantage.[313] A key problem in the regulation of transboundary pollution is that the source state has an incentive to externalize the costs of pollution, and the affected state has an incentive to externalize the costs of regulation. In these circumstances, it is very difficult to get an accurate bead on how either of the parties truly values the costs and benefits of regulation. The strict liability norm compounds the problem by creating an incentive for the affected state to exaggerate its damages, and for the source state to deny all causal responsibility.

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312. *See supra* notes 254–56 and accompanying text.
313. *See supra* notes 257–59 and accompanying text.

The golden rules help overcome these problems by adopting as the benchmark the balance of costs and benefits that one of the states has already struck when dealing with similar problems within its own jurisdiction. When faced with a pollution problem as a matter of internal governance, a state must strike a balance between the costs and benefits of regulation under circumstances where both sides of the ledger must be considered. Thus, the actual practice of a state when dealing with such a problem is likely to reflect a more candid appraisal of both the benefits and costs than can be obtained by asking only the source state or only the affected state what they think about these values.

C. *Two Applications*

The superior capacity of the golden rules to reach satisfactory resolutions of transboundary pollution disputes can be illustrated by briefly considering two prominent cases where a norm of strict liability arguably has been applied. Consider, first, how *Georgia v. Tennessee Copper Co.*[314] might have been resolved under the golden rules. Recall that the Tennessee Supreme Court had previously ruled that the fumes from the smelters were a nuisance as a matter of Tennessee law.[315] Based on this prior determination, the U.S. Supreme Court could have resolved the case on the basis of the golden rule, reasoning that where a source state has determined that pollution is unlawful when directed at its own citizens, it necessarily follows that the same pollution is unlawful when directed at persons in a neighboring state.

Of course, the pollution that the Tennessee Supreme Court deemed to be a nuisance was produced by a different method of roasting ore, and the Tennessee plaintiffs may have lived in greater proximity to the fumes than did many of the Georgia victims.[316] It is not implausible to assume, however, that the judgment of the Tennessee court, reached as a matter of internal Tennessee law, would end up being the case involving facts most similar to the transboundary pollution of which Georgia complained. That "precedent" would suggest that the copper smelters were guilty as charged of committing a transboundary nuisance. So

314. 206 U.S. 230 (1907).
315. *See supra* notes 52–53 and accompanying text.
316. *See supra* text accompanying notes 54–56.

far, the golden rules would produce the same outcome as the one reached by the Court.

With respect to the question of remedy, however, the golden rules would point to a different result. Tennessee had not only determined that the sulfur fumes were a nuisance, it had also determined that damages were the proper remedy, rather than injunctive relief.[317] Assuming as before that Tennessee's determination turned out to be the most factually similar case in constructing the appropriate relief, then the golden rules would suggest that the Supreme Court should also have awarded damages to Georgia for the transboundary pollution.[318] In effect, the Tennessee Supreme Court's weighing of competing interests in determining the proper relief with respect to its own citizens would be deemed the best guide as to what relief should be awarded once the controversy became a transboundary dispute.

The wisdom of this approach is arguably confirmed by the subsequent history of the case. It turned out that Georgia did not really want the copper smelters shut down. Although located in Tennessee, the smelters were important to the economy of northwest Georgia. After the Supreme Court's initial decision, Georgia agreed to postpone enforcement of the decree for many years while additional technological improvements were adopted.[319] Later, Georgia entered into a settlement with one smelter calling for a partial abatement of the pollution and the creation of an arbitration panel to award compensatory damages to citizens of Georgia who could show they had sustained harm.[320] When one of the other smelters refused to settle, the Supreme Court eventually entered (and then modified) an injunction requiring partial

317. *See* Madison v. Ducktown Sulphur Copper & Iron Co., 83 S.W. 658, 666–67 (Tenn. 1904).

318. The award should have been given unless there were some reason inherent in a federal court's adjudication of the problem that would preclude such relief. *See* North Dakota v. Minnesota, 263 U.S. 365, 371–76 (1923) (suggesting that the Eleventh Amendment may preclude the Supreme Court from awarding damages in a transboundary nuisance case).

319. *See* Georgia v. Tennessee Copper Co., 237 U.S. 474, 475 (1915) (describing lengthy negotiations between the parties, the installation of further control devices, a settlement between Georgia and one of the companies, and authorizing an injunction limiting discharge to twenty tons of sulfur per day during warm season for the nonsettling company), *amended by* 237 U.S. 678, 678–79 (1915) (ordering recordkeeping and inspection of the defendant corporation, as well as requiring defendant to prevent the escape of fumes with a certain amount of sulphur content).

320. *See Tennessee Copper*, 237 U.S. at 475–76.

abatement by this party along the lines agreed to by the settling smelter.[321] Eventually, all parties settled on the basis of partial control of pollution combined with payment of claims established by arbitration for any residual damages.[322] One can imagine that an order entered in 1907 awarding temporary damages to all Georgia residents harmed by the pollution would have achieved essentially the same result without the need for the Court's subsequent additional relief and modifications of relief between 1907 and 1938 when the case was finally resolved.[323]

Another prominent dispute that arguably would have been resolved more satisfactorily under the golden rules is *Arkansas v. Oklahoma*.[324] In that case, the Court upheld the EPA's interpretation of the Clean Water Act as permitting an affected state to block discharges from a source in an upstream state if it can show that discharges will result in a "detectable violation" of the affected state's water quality standards.[325] The EPA's detectable violation standard, however, ignores all questions about whether the affected state is in compliance with its own water quality standards. If an affected state has failed to regulate domestic sources sufficiently to insure compliance with its own water quality standards, why should a source in another state be forced to prevent a "detectable violation" of those same standards?

The problem is that the EPA test is geared to the official norms of the affected state—its stated water quality standards—and not to the actual practices of the affected state. Thus, under the EPA test it would be possible for Oklahoma to demand

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321. *See id.* at 478; Georgia v. Tennessee Copper Co., 240 U.S. 650 (1916), *modifying* 237 U.S. 474 (1915).

322. *See* Joint Motion of the State of Georgia and Tennessee Copper Company to Enter an Order of Dismissal at 5–11, Georgia v. Tennessee Copper Co., 206 U.S. 230 (1907) (filed October Term, 1937); Georgia v. Tennessee Copper Co., 302 U.S. 660, 660 (1938) (granting joint motion to dismiss); Georgia v. Tennessee Copper Co., 304 U.S. 546, 546 (1938) (vacating all orders and decrees previously entered).

323. The Supreme Court's injnnctions may have had a "technology forcing" effect in stimulating the smelters to develop new control technologies. *See* PERCIVAL ET AL., *supra* note 291, at 167. But an award of temporary damages, which could be renewed periodically, would also have provided a powerful incentive for the smelters to develop control techniques to reduce damages. The prospect of repeated damage payments "will give the polluter an incentive to develop (or purchase from others) environmentally superior technologies that permit a greater level of pollution control at lower cost." PETER S. MENELL & RICHARD B. STEWART, ENVIRONMENTAL LAW AND POLICY 186 (1994).

324. 503 U.S. 91 (1992).

325. *Id.* at 94, 107.

that Arkansas adopt expensive control measures in order to prevent a "detectable violation" of Oklahoma water quality standards, while Oklahoma itself was violating those standards under similar circumstances. This would allow Oklahoma to seize the benefits of environmental controls while exporting the costs to its neighboring state. The Court was aware of the danger of strategic behavior by the affected state, and invoked this concern in rejecting the court of appeals construction of the Act, which (in effect) was strict liability without any significant harm threshold.[326] Nevertheless it failed to consider that the EPA standard also creates a potential for strategic behavior.

The golden rules suggest that a better approach to implementing the Clean Water Act would be to ask whether a discharge from an upstream state will result in a detectable *degradation* of existing water quality in the affected state. This approach is simply an application of the reverse golden rule. Using actual, rather than official water quality standards as a benchmark water quality in effect incorporates the affected state's existing practices into the norm against which the source state is judged. Adopting actual water quality as the relevant benchmark eliminates incentives for cost-exporting behavior; the affected state can ask that the source state undertake control measures only if it has already done so itself in analogous circumstances. Thus, the actual water quality standard is more likely to bring the two states into harmonious agreement.

D. *Progress, Not Panacea*

None of this is to deny that the golden rules have their shortcomings. There may be instances where novel forms of transboundary pollution emerge, and neither state has any record of regulation that can be meaningfully invoked as a standard against which to assess the transboundary effects. For example, one state may have many nuclear reactors and lax regulations about radiation leaks; its neighbor may be so alarmed by the thought of radiation leaks that it has never permitted a reactor to be built, and hence has no regulations on point. Alternatively, two states may

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326. *See id.* at 111 ("If every discharge that had some theoretical impact on a downstream State were interpreted as 'degrading' the downstream waters, downstream States might wield an effective veto over upstream discharges.") See also Oklahoma v. EPA, 908 F.2d 595, 618–20 (10th Cir. 1990) (detailing circuit court's view).

have radically different attitudes about certain types of transboundary harms. For instance, one state may be rich and have a strong preference for environmental controls even at the expense of economic growth; its neighbor may be poor with a strong preference for economic growth rather than environmental regulation. This scenario may in fact describe the United States-Mexican relationship, with its many transboundary pollution problems.

But the relevant question is not whether the golden rules generate perfect solutions to every imaginable problem.[327] Rather, it is whether the golden rules do a better job of getting us to satisfactory solutions to transboundary pollution disputes than their principal rival, the norm of strict liability. In theory, strict liability may generate better solutions to novel transboundary problems or to situations involving special sensitivities. But if strict liability cannot generate an effective regime for collective action, its advantage will be simply that—theoretical. And there is no reason to think that a norm of strict liability provides a better accommodation of interactions between the rich and the poor, like those along the border between the United States and Mexico. If anything, strict liability offers an even more one-sided, pro-environmental rule; that is, a rule likely to be favored by rich nations and resented by poor nations.[328]

CONCLUSION

The world's legal systems have generally failed in their efforts to find a solution to transboundary pollution. The basic problem is structural. The harm inflicted by transboundary pollution is reduced by the distance it travels, and in more recent times, by regulatory systems adopted for other purposes that also limit the level and incidence of transboundary pollution. Transboundary pollution problems are typically isolated and episodic as well. Perhaps most importantly, given the highly conflicted interests involved in a transboundary pollution dispute, the source state has little incentive to cooperate in forming a legal regime that promises new and onerous burdens for the benefit of the affected state.

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327. To demand a standard that produces answers to all conceivable problems is to commit the nirvana fallacy. *See* Harold Demsetz, *Information and Efficiency: Another Viewpoint,* 12 J.L. & ECON. 1, 1 (1969).

328. *See* Stewart, *supra* note 186, at 2080 (noting that states with higher per capita incomes often prefer stronger environmental controls).

The most promising strategy for achieving limits on transboundary pollution is contractual. Since typically a small number of states are involved in a transboundary pollution dispute, and the states act as representatives of all individuals who are adversely affected, a bilateral or multilateral agreement is possible. The principal problem is how to devise the means of providing offsetting compensation to the source state as consideration for its agreement to cooperate in a contractual solution. Such an arrangement will most easily be reached where the transboundary pollution is partial or reciprocal—as in the case of boundary waters or acid rain—and where in-kind benefits can be offered as at least partial consideration.

The content of the legal norms that apply to transboundary pollution is also relevant in determining how often bilateral and multilateral agreements can be reached. Just as settlements of lawsuits are influenced by the content of the legal rules to be applied at trial, parties to a transboundary pollution dispute will be able to reach an agreement more easily if the rules they assume apply to such pollution are predictable, create minimal opportunities for threatening positions, and require the disclosure of private information about the parties' true preferences. The current consensus view about the norm that ought to apply to transboundary pollution—a universal rule of strict liability for significant harm—fares poorly under these criteria, and most likely works in counterproductive ways to frustrate Coasean bargains.

Fortunately, one does not have to start from scratch in seeking better legal norms. Returning to the font of today's official norms—the Supreme Court's original jurisdiction decisions from the first three decades of this century—one finds that the Court resolved these cases not in terms of universal abstractions, but rather in accordance with individualized determinations of equity. Moreover, the decisions suggest—with a little teasing and some supplementation with modern international authority—that the basic norm informing these equitable judgments is one of reciprocity. The source state should treat the affected state the way it treats its own citizens, and the affected state should demand of the source state no more than it demands of its own citizens.[329]

329. Even the venerable maxim *sic utere, see supra* text accompanying note 115, is sufficiently ambiguous to stand as authority for the golden rules. A number of older nuisance cases refer to the maxim as incorporating the basic idea of the golden rule. *See,*

These golden rules provide the basis for a different conception of the legal regime, one that is more predictable, less threatening, and more likely to lead to the disclosure of the parties' true preferences.

Would a new legal regime based on the golden rules solve all transboundary pollution problems? Most problems of transboundary pollution will continue to evade a solution, uuless they get much worse or the cost of creating legal institutions drops significantly. There is reason to believe, however, that the golden rules would establish a background understanding more successful at facilitating bilateral and multilateral agreements than a universal norm of strict liability. The promise of the golden rules is that they would do a better job of encouraging contractual bargaining between states, where progress is most likely to be achieved. That is probably all one can ask of a legal norm in dealing with what may be environmental law's most vexing dilemma.

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e.g., Waschak v. Moffat, 109 A.2d 310, 321–22 (Pa. 1954) (Musmanno, J., dissenting); Beam v. Birmingham Slag Co., 10 So. 2d 162, 166 (Ala. 1942); Coakley v. Ajuria, 290 P. 33, 35 (Cal. 1930); Akers v. Mathieson Alkali Works, 144 S.E. 492, 495 (Va. 1928).